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Kansas Entomological Society
Vol. 23 April, 1950 Number 2

# THE PHYLLOPHAGA OF TEXAS (SCARABAEIDAE, COLEOPTERA)

H. J. REINHARD
College Station, Texas

(Continued from January issue)

## ANNOTATED LIST OF PHYLLOPHAGA SPECIES

1. **P. lanceolata** (Say). Jour. Ac. N. S. Phil., 3:242, 1824 **(Melolontha).**

   A common grayish brown diurnal species in which the form varies with the sex. Male smaller, winged and active; female moderately heavy-bodied, apterous and rather sluggish. One-year life cycle; pupates in spring. Adults emerge mainly during May and early June. Oviposition is frequently extensive in wheat fields and feeding activities of the grubs result in severe losses to the crop. The beetles feed commonly upon young cotton, cowpea, bean and to a lesser extent peanut. Native food plants include: **Oenothera speciosa, Rudbeckia** sp., **Solanum rostratum** and **Amaranthus viridis.** Occurs commonly throughout the blackland region and ranges west and northwestward into the Panhandle. Late April to mid July.

2. **P. squamipilosa** Saylor. Can. Ent., 68:280, 1936.

   Known only in the unique male type from Texas without precise locality.

3. **P. epigaea** (Wickham). Can. Ent., 35:71, 1903 **(Lachnosterna).**

   A small moderately shiny black species described from Alpine. Collected in numbers during the daytime at Valentine and Marathon during July, 1938, by Dr. R. H. Beamer and associates. Also, recorded from Fabens, July 23, 1941 (Ted McGregor). Nothing appears known concerning the biology and habits of the species.

4. **P. rubricosa** Reinhard. Jour. Kans. Ent. Soc., 12:47, 1939.

   A small reddish brown crepustular species in which the female lacks functional wings. Two-year life cycle; pupates in fall. Adults emerge early in the season and are occasionally destructive to seedling watermelon and cantaloupe plants. Occurs abundantly in Dimmit and Zavalla and occasionally in Atascosa and Wharton Counties. February 6 to April 27.

5. **P. pusillidens** Fall. Can. Ent., 69:31, 1937, new name for **P. microdon** Fall, Bull. Brk. Ent. Soc., 24, 113, 1929, preoccupied.

   Only two males, both from Presidio, July 18, 1930 and May, 1935 (W. L. Owen), are included in the collection. Originally described from four specimens all from Brewster County.

6. **P. aequalis** (Leconte). Proc. Ac. N. S. Phil., 6:440, 1853 **(Tostegoptera,** female).

   The male, which differs rather markedly in habitus from the female, was described by Horn as **Lachnosterna exorata,** (Trans. Am. Ent. Soc., 14:278, 1887). Abundant at Winterhaven and Crystal City. Male winged and taken commonly in light trap. Female apterous and similar to **cribrosa** in general aspect, but readily distinguished by the

smoother elytra. Two-year life cycle; pupates in fall. Adults active April to August.

7. **P. renodis** Reinhard. Jour. Kans. Ent. Soc., 12:48, 1939.

The type, a unique male, was taken at Fowlerton, March 23, 1938 during midday by C. E. Heard. I have reported on two additional specimens, one a female, from Hidalgo and Cameron Counties (Jour. Kans. Ent. Soc., 13:5, 1940). Normally black in color; both sexes apterous. Active from March to August.

8. **P. cribrosa** (Leconte). Proc. Ac. N. S. Phil., 6:231, 1853 (**Tostegoptera**).

A black robust apterous species, which frequently migrates on foot in large numbers or armies during late afternoon. Practically all green or succulent plants in the path of such migrations are subject to attack. The beetles feed voraciously while on the march and young cotton, corn, wheat, spinach and other truck crops may be completely destroyed over extensive areas. Two-year life cycle; pupates in fall. Range general over the western three-fourths of State. February 11 to October 11.

9. **P. zavalana** Reinhard. Jour. Kans. Ent. Soc., 19:69, 1946.

Strikingly similar to the preceding species in general habitus but averaging slightly smaller in size; the essential differences are mentioned in the accompanying key. Known only from Dimmit and Zavala Counties, where the species occasionally occurs in destructive numbers in spinach fields. Life cycle unknown. April to October.

10. **P. farcta** (Leconte). Jour. Ac. N. S. Phil. (2), 3:238, 1856 (**Lachnosterna**).

A robust feebly winged shining brown species, abundant throughout the blackland region of the State and ranging west and north to Sutton, Oldham and Ochiltree Counties. Oviposition at times extensive in pastures or grasslands, where grubs may materially reduce the grass coverage. Truck crops, particularly onions and garlic, are also subject to attack by the grubs, with losses ranging up to 50 per cent of the crop. During April, 1940, a heavy emergence of beetles destroyed stands of young field corn over large acreages in Caldwell County. Two-year life cycle; pupates in fall. March 14 to October 21.

11. **P. pleroma** Reinhard. Jour. Kans. Ent. Soc., 13:5, 1940, new name for **P. plena** Reinhard, op. cit., 12: 49, 1939, preoccupied.

Recorded only from Nueces and San Patricio Counties, where at times the species occurs abundantly feeding on truck crops in general. Also recorded as damaging gladiolus bulbs. Female robust, apterous, dark brown to blackish; male oblong, depressed, winged, reddish brown. Two-year life cycle; pupates in fall. February 18 to April 20.

12. **P. torta** (Leconte). Jour. Ac. N. S. Phil., (2), 3:239, 1856 (**Lachnosterna**).

This rather large light brown species occurs abundantly throughout the blacklands, ranging from the Red River south to the Rio Grande Valley and westward to Brewster County. Adults commonly feed on pecan and elm; also taken on rose, plum, hackberry, fig, pear, apricot and black walnut. One-year life cycle; pupates in spring. May 3 to October 14.

13. **P. hamata** (Horn). Trans. Am. Ent. Soc., 14:220, 1887 (**Lachnosterna**).

The type is a unique male from Texas without specific locality. Re-

corded from Bexar, Sutton, Menard and Tom Green Counties during June, 1932-40. Life cycle unknown.

14. **P. pratermissa** (Horn). Trans. Am. Ent. Soc., 14:223, 1887 **(Lachnosterna).**

This smallish to medium-sized reddish brown species occurs generally throughout East Texas. Adults emerge early in the season and are frequently very abundant at light. Taken on post oak, pin oak, elm, plum and meyer lemon. Two-year life cycle; pupates in fall. March 4 to May 20.

15. **P. ephilida** (Say). Jour. Ac. N. S. Phil., 5:196, 1825 **(Melolontha).**

A moderately shining light brown species, which emerges rather late in the season. Taken in limited numbers at light in Galveston, Jefferson, Jasper and Liberty Counties. Food plants and life cycle not known. May 27 to August 14.

16. **P. ephilida virilis** Reinhard. Jour. Kans. Ent. Soc., 12:51, 1939.

Differs from the typical form mainly in structure of the male genitalia. Recorded only from Galveston and Montgomery Counties. June and July.

17. **P. arkansana** (Schaeffer). Trans. Am. Ent. Soc., 32:257, 1906 **(Lachnosterna).**

A moderately large deep reddish brown species of distinctive appearance. Elytra rather strongly rugose and subshiny. Beetle flights begin early in the season but vary considerably in extent from year to year. Confined to the eastern part of the State from Liberty County north to the Red River. Recorded food plants include: oak, elm, pecan, plum and persimmon. Two-year life cycle; pupates in fall. March 3 to June 4.

18. **P. longistarsa** (Say), Jour. Ac. N. S. Phil., 3:241, 1824 **(Melolontha).**

This small pallid species was collected in numbers, while feeding on cocklebur, **Xanthium** sp., June 4, 1934 along the sandy banks of the Brazos River in Burleson County. Also taken at light during the same month and year in McLennan and El Paso Counties. No additional material has come to light in subsequent years.

19. **P. clemens** (Horn). Trans. Am. Ent. Soc., 14:227, 1887 **(Lachnosterna).**

Horn reported the species from Texas without precise locality. It has not been taken in the State during the course of the present studies.

20. **P. taxodii** Langston. Ann. Ent. Soc., Am., 17:449, 1924.

The only known records for the State of this interesting little species are two males taken in Morris and Orange Counties, July and August, respectively. Both collections were made at light and local food plants are not known.

21. **P. gracilis** (Burmeister). Handb. Ent., 4:361, 1855 **(Trichestes).**

This species was recorded from Texas by Horn (Trans. Am. Ent. Soc., 14, p. 230). The typical form has not been taken locally and Horn's record may actually refer to the following form.

22. **P. gracilis angulata** Glasgow. Can. Ent., 57:294, 1925.

Hardly distinguishable from **gracilis gracilis** Burm., except by reference to the genitalia. Occurs in East Texas from Morris County south

to Galveston and westward to Bastrop and McLennan Counties. Life cycle and food plants not known. May 7 to August 10.

23. **P. futilis** (Leconte). Agassiz, Lake Superior, 4:226, 1850 **(Lachnosterna).**

A smallish to medium-sized light brown species readily distinguished by the peculiar fixed inner tibial spur in the male. Recorded only from Nacogdoches County; 83 specimens taken in light trap, March 16 to April 4, 1939.

24. **P. hirtiventris** (Horn). Trans. Am. Ent. Soc., 14:231, 1887 **(Lachnosterna).**

Originally described from Texas without precise locality. Common throughout the eastern half of the State. An average-sized reddish brown species in which the male venter is densely haired. Taken on pecan, oak, ash, willow, elm and hackberry. Two-year life cycle; pupates in fall. March 3 to June 22.

25. **P. congrua** (Leconte). Proc. Ac. N. S. Phil., (2), 3:243, 1856 **(Lachnosterna).**

With about the same general habitus and range of the preceding species but somewhat less abundant, except possibly in the blackland region. Male venter glabrous, with apical segments longitudinally furrowed at middle. Pecan, elm and oak are the only recorded food plants. Two-year life cycle; pupates in fall. March 16 to April 30.

26. **P. prunina** (Leconte). Jour. Ac. N. S. Phil., (2), 3:251, 1856 **(Lachnosterna).**

A robust species of distinctive appearance. Elytra with a changeable whitish bloom, which appears denser when viewed from an oblique anterior angle; pronotum subshiny and conspicuously sculptured. Occurs in East Texas from Titus and Cass Counties south to Montgomery ranging westward to Travis, Eastland and Erath Counties. Taken on elm, pecan, oak, sweetgum, black walnut, rose and persimmon. Two-year life cycle; pupates in fall. March 16 to July 11.

27. **P. sodalis** Reinhard. Jour. Kans. Ent. Soc., 13:4, 1940.

Quite similar to **prunina** Lec., including genital characters, but differs widely in coloration. The elytra show no trace of any pruinosity and are distinctly shiny. Taken only at light. Life cycle not known. Ranges from north central to southeast central Texas, including Eastland, Erath, Milam, Brazos, Travis, Bastrop, Colorado and Atascosa Counties. April and May.

28. **P. sylvatica** Sanderson. Jour. Kans. Ent. Soc., 15:49, 1942.

An average-sized shining deep brownish species, which differs from **corrosa** Lec. mainly in genital characters. Two males taken at light, Smith County, May 9, 1941.

29. **P. corrosa** (Leconte). Jour. Ac. N. S. Phil., (2), 3:249, 1856 **(Lachnosterna).**

Described from Texas without definite locality and also recorded under the name **L. affinis** Lec., (Trans. Am. Ent. Soc., 14, p. 233). Occurs in Atascosa, Colorado, Erath, Gillespie, Hemphill, Mason, Milam and Wharton Counties. Taken only at light. March 19 to May 7.

30. **P. calceata** (Leconte). Jour. Ac. N. S. Phil., (2), 3:250, 1856 **(Lachnosterna).**

A very common species, which ranges generally over the eastern half of the State. Easily distinguished in both sexes by the peculiar structure of the hind tarsi. Adults begin to emerge early in the season and feed primarily on oak and elm. Two-year life cycle; pupates in fall. February 22 to June 23.

31. **P. crassissima** (Blanchard). Cat. Ent., 1:133, 1850 **(Ancylonycha).**

One of the most abundant species in the local fauna, which also has been described from Texas as **L. generosa** Horn (Trans. Am. Ent. Soc., 14, p. 222). Occurs throughout the eastern half of the State extending northwestward into the Panhandle. In well preserved specimens the elytra may show a thin but distinct irridescent sheen. Taken on oak, elm, persimmon, ash, plum, hackberry, apple and hawthorn. Two-year life cycle; pupates in fall. February 10 to July 10.

32. **P. inversa** (Horn). Trans. Am. Ent. Soc., 14:241, 1887 **(Lachnosterna).**

In the above reference this species is listed from Texas; no additional local material has been taken or reported.

33. **P. temora** Saylor. Proc. Biol. Soc. Wash., 56:135, 1943.

Five specimens (paratypes) recorded from Val Verde County.

34. **P. bipartita** (Horn). Trans. Am. Ent. Soc., 14:242, 1887 **(Lachnosterna).**

An average-sized deep reddish to dark brown species, which occurs abundantly at times throughout East Texas from the Red River to the upper Gulf Coastal Counties. Taken on pecan, oak and persimmon. Two-year life cycle; pupates in fall. March 12 to June 9.

35. **P. sacoma** Reinhard. Jour. Kans. Ent. Soc., 12:52, 1939.

Similar to **micans** Knoch, but readily distinguished by genitalic differences. Taken only at light. Montgomery, Walker, Nacogdoches, Cherokee, Smith, Van Zandt and Robertson Counties. March and April.

36. **P. micans** (Knoch). Neue Beytr. Ins., 1:77, 1801 **(Melolontha).**

An elongate pruinose reddish brown species; common throughout East Texas, ranging westward to Travis and Comal Counties. One- or two-year life cycle; pupates in fall. Taken on pecan, oak, persimmon, rose and jujube. March 2 to June 24.

37. **P. micans cupuliformis** Langston. Ann. Ent. Soc. Am., 17:450, 1924.

Differs from the typical form mainly in genital details. Taken only at light during April in Walker and Angelina Counties.

38. **P. vehemens** (Horn). Trans. Am. Ent. Soc., 14:244, 1887 **(Lachnosterna).**

A large uniform dark brown species, readily distinguished in the male, by the hook-tipped inner spur of hind tibia and angulate posterior margin of the hind femur. Not abundant but widely distributed in East Texas. Taken on ash. Titus, Nacogdoches, Liberty and Brazos Counties. March 16 to April 28.

39. **P. fervida** (Fabricius). Species Ins.: 32, 1775 **(Melolontha).**

An average-sized moderately shiny dark brown species; taken only at light. Nacogdoches County. March and April.

40. **P. anxia** (Leconte). Agassiz, Lake Superior : 226, 1850 **(Lachnosterna).**

Similar to the preceding species in general habitus, but readily distinguished by the genital characters. Collected on nectarine and persimmon. Jefferson County. May.

41. **P. karlsioei** (Linell). Proc. U. S. Nat. Mus., 19:400, 1897 **(Lachnosterna).**
One of the largest southwestern species, which may be readily recognized by its broad oblong build and distinctive genitalia. Taken locally on ash and pecan and at light in limited numbers in Brazos, Walker, Angelina, Nacogdoches, Smith, Morris and Cass Counties. March 31 to May 31.

42. **P. fraterna** Harris. Rpt. Ins. Inj. Veg. : 29, 1841.
A smallish deep brown species represented in the available material by six specimens taken at light in Nacogdoches County. March and April.

43. **P. forsteri** (Burmeister). Handb. Ent., 4:325, 1855 **(Ancylonycha).**
This widely distributed species occurs rarely in the southwest. Four specimens taken at light. Smith and Cooke Counties. April and June.

44. **P. scitula** (Horn). Trans. Am. Ent. Soc., 14:256, 1887 **(Lachnosterna).**
A fine moderately large species readily distinguished by its pale brownish yellow subshiny elytra and opaque darker thorax. Taken in limited numbers at light and on pecan. Wood, Van Zandt, Smith, Anderson, Nacogdoches, Grimes, Brazos, Guadalupe and Erath Counties. March 2 to June 14.

45. **P. curialis** Reinhard. Jour. Kans. Ent. Soc., 12:54, 1939.
The type is from Liberty County. No additional material has come to light.

46. **P. profunda** (Blanchard). Cat. Ent., 1:132, 1850 **(Ancylonycha).**
A deep brown robust species with distinctive genital characters. Common throughout East Texas ranging westward to Travis and Erath Counties. Two-year life cycle; pupates in fall. Taken on oak, pecan, elm, rose and plum. March 4 to June 16.

47. **P. rugosa** (Melsheimer). Proc. Ac. N. S. Phil., 2:140, 1846 **(Ancylonycha).**
Horn reported this species from Texas without specific locality (Trans. Am. Ent. Soc., 14, p. 259), One male, labeled "Austin, Texas X, 1900" was discovered by Dr. M. W. Sanderson in the Washington State College collection. No additional local specimens have been taken during the course of the present study.

48. **P. incuria** Sanderson. Jour. Kans. Ent. Soc., 15:53, 1942, new name for **P. texana** Sanderson, op. cit., 10:16, 1937, preoccupied.
Described from Orange County, Texas. No additional material has been taken.

49. **P. pudorosa** Reinhard. Jour. Kans. Ent. Soc., 12:55, 1939.
Known only in the type series from Morris County, Texas and Shreveport, Louisiana.

50. **P. hirticula** (Knoch). Neue Beytr. Ins., 1:79, 1801 **(Melolontha).**
Horn reported the occurrence of this species in Texas (Trans. Am. Ent. Soc., 14, p. 267), but no additional material has been brought to light.

51. **P. delata** (Horn). Trans. Am. Ent. Soc., 14:267, 1887 **(Lachnosterna).**
Although no definite State record is available for this species, it has been taken by Dr. M. W. Sanderson in Hemstead County, Arkansas, within 30 miles of the Texas border. Future collecting will likely disclose the occurrence of this species in northeast Texas.

52. **P. aemula** (Horn). Trans. Am. Ent. Soc., 14:271 **(Lachnosterna).**
Occurs in Brazos County; 33 specimens taken on pecan and grape. April 26 to May 24. A rather robust species, with a uniform vestiture of short pale appressed hairs. The genital characters are distinctive.

53. **P. arcta** (Horn). Trans. Am. Ent. Soc., 14:271, 1887 **(Lachnosterna).**
A rather small reddish yellow to pale brownish species, which may be readily distinguished from all other forms, except the following, by the uncommonly fine puncturation of the entire upper surface. Taken only at light. Morris, Nacogdoches and Leon Counties. June 21 to August 12.

54. **P. opacita** Reinhard. Jour. Kans. Ent. Soc., 12:56, 1939.
Known only in the type series from Bastrop County. Quite similar to **arcta** in all details except the genitalia, which show apparently distinct differences.

55. **P. crenulata** (Froelich). Natur. Stueck, 26:94, 1792 **(Melolontha).**
A light to dark brown hairy species, with the lateral margins of the thorax strongly crenulate. The genitalic characters are most reliable to distinguish the species from closely allied forms. Fairly numerous in northeast Texas. Taken on pecan and grape. Cass, Morris, Smith, Shelby, Nacogdoches, Brazos, Limestone, Dallas and Erath Counties. April 13 to July 19.

56. **P. vetula** (Horn). Trans. Am. Ent. Soc., 14:274, 1887 **(Lachnosterna).**
This typically southwestern species occurs in El Paso County. Twenty-four specimens taken at light, June 25 and July 3, 1942 (M. S. Malone); and 17 additional specimens from the same locality, also taken at light, June 17, 1948 (H. S. Barber and V. J. Shiner).

57. **P. rubiginosa** (Leconte). Jour. Ac. N. S. Phil., (2), 3:259, 1856 **(Lachnosterna).**
The most abundant and widespread among the hairy species of the local fauna; variable in size and color but with distinctive genitalia. Occurs from East Texas westward to Val Verde and Dickens Counties. Taken on prickly ash, oak, elm, smilax, dogwood, redbud, hackberry, privet, rattan and rose. Two-year life cycle; pupates in fall. March 2 to June 22.

58. **P. parvidens** (Leconte). Jour. Ac. N. S. Phil., (2), 3:259, 1856 **(Lachnosterna).**
A uniform reddish brown subopaque hairy species, very similar in general aspect to **rubignosa** Lec., from which it is distinguished mainly by the characters listed in the accompanying key. Fairly abundant in East and Northeast Texas and less frequent southwestward to Atascosa and LaSalle Counties. Taken on pecan and persimmon. March 18 to June 19. A variety of the present species described from Victoria County, under the name **P. parvidens hystropyga** Davis (Bull. Ill. Nat. Hist. Surv., 13, p. 336), does not differ from the typical form excepting its smaller size.

59. **P. elizoria** Saylor. Rev. de Ent., 5:321, 1937, new name for **Lachnosterna pygidialis** Schaeffer, Trans. Am. Ent. Soc., 32:257, 1906, preoccupied.
One male taken in Japanese beetle trap, Menard, July 10, 1939 (Roy Melvin).

60. **P. submucida** (Leconte). Jour. Ac. N. S. Phil., (2), 3:260, 1856 **(Lachnosterna).**

A handsome reddish brown species characterized by a thin irridescent whitish sheen on the upper surface. Common and widely distributed over the State except the western limits. One- and two-year life cycle; pupates in spring. Taken on pecan, elm, plum, hackberry, rose, fig, sycamore, willow, citrus and **Tamarix** sp. March 22 to September 18.

61. **P. glabricula** (Leconte). Jour. Ac. N. S. Phil., (2), 3:260, 1856 **(Lachnosterna).**

A moderately shining pale reddish brown species, with distinctive genital characters. Occurs in west and northwest Texas, including Panhandle, ranging eastward to Johnson and Dallas Counties. Taken only at light. May 18 to September 23.

62. **P. riviera** Reinhard, n. sp. Kleberg County, April 9 to June 19, 1946-47. Abundant.

63. **P. gaigei** Sanderson. Oc. Papers Mus. Zool. Univ. Mich., No. 504:4, 1948. Known only in the type series; taken at light in the Chisos Mountains, Brewster County. July 25, 1928.

64. **P. idonea** Sanderson. Oc. Papers Mus. Zool. Univ. Mich., No. 504:1, 1948. Chisos Mountains, Brewster County, July 5-17, taken at light.

65. **P. ignava** (Horn). Trans. Am. Ent. Soc., 14:280, 1887 **(Lachnosterna).**

A moderate-sized shining brown species, readily separated from allied forms by the peculiar male genital characters. The beetles emerge after midseason and have not been observed in large numbers in any locality. L. J. Bottimer recorded adults feeding on **Karwinskia humboltiana** Zucc., in West Texas. Brewster, El Paso, Presidio, Pecos, Val Verde, Uvalde, Sutton, Menard and Johnson Counties. April 27 to September 24.

66. **P. psiloptera** Sanderson. Jour. Kans. Ent. Soc., 12:7, 1939.

Described from a pair of specimens collected in the Chisos Mountains, Brewster County, July 27, 1937 (B. Hartelius). No additional material is known.

67. **P. affabilis** (Horn). Trans. Am. Ent. Soc., 14:283, 1887 **(Lachnosterna).**

Similar in form and color to **ephilida** Say, but the inner spur of the hind tibia in the male is apparently free; there are also wide differences in the genitalia. Occurs abundantly after midseason, in Galveston and Jefferson Counties; also taken at light in Madison, Tom Green and Hale Counties. July 12 to September 13.

68. **P. crinita** (Burmeister). Handb. Ent., 4:260, 1855 **(Trichestes).**

A smallish bright reddish brown species in which the head and thorax are sparsely pilose and the elytra bear little or no pubescence. The male antennal club is strikingly elongate. Common and widespread except in the northeastern part of the State. One-year life cycle; pupates in spring. Taken on pecan, citrus and **Tamarix** sp. April 19 to October 5.

69. **P. antennata** (Smith). Ent. Amer., 5:99, 1889 **(Lachnosterna).**

Similar to the preceding species in most essential details, except genitalia and the much smaller build. Described from Texas without precise locality. Taken only at light in limited numbers. Cameron,

Kerr, Gillespie, Kimble, Menard, Tom Green and Coleman Counties. March 21 to May 13.

70. **P. tristis tristis** (Fabricius). Species Ins., 1:39, 1781 **(Melolontha).**
Distinguished from the preceding and following forms mainly by the items listed in the accompanying key. Southwestern specimens average smaller in size than the northern but there are seemingly no other significant differences. Egg to adult development occurs within the limits of one growing season; pupates in fall. Taken only at light in limited numbers. Nacogdoches County. March and April.

71. **P. tristis suttonana** Reinhard. Jour. Kans. Ent. Soc., 12:59, 1939.
Very similar to **tristis tristis** Fabr. in general aspect, differing principally in male genital characters. Occurs in the semi-arid regions of West Texas. Taken only at light. Sutton, Tom Green and Menard Counties. April 5 to 22.

72. **P. tristis amplicornis** Reinhard. Jour. Kans. Ent. Soc., 12:59, 1939.
This pallid form is readily distinguished from the others of the **tristis** complex, by the elongate male antennal club and the distinctive genitalia. Life cycle as in the typical form, a complete generation in one year; pupates in fall. Pecan is the only known food plant. Abundant in Erath County and taken in lesser numbers at light in Smith, Brazos, Milam, Atascosa, Bexar, Colorado, Gillespie and Mason Counties. February 24 to May 9.

73. **P. tristis apicata** Reinhard. Jour. Kans. Ent. Soc., 12:58, 1939.
The peculiar male genital features of this form readily distinguish it from all others in the **tristis** complex. There are few other differentiating items. Not abundant but widespread in East Texas. Life cycle as mentioned under **tristis tristis.** Taken on oak, pecan, elm and jujube. Brazos, Nacogdoches, Angelina, Smith and Red River Counties. March 16 to May 7.

74. **P. heterodoxa** (Horn). Trans. Am. Ent. Soc., 14:289, 1887 **(Lachnosterna).**
The type locality of this species given as, "Southern Arizona or possibly Chihuahua", suggests its possible occurrence in the southwestern border region of the State, where little or no collecting has yet been done.

75. **P. ravida guatemalica** Moser. Stett. Ent. Zeit., 79:24, 1918.
Sanderson reported one male from Laredo, Texas (Jour. Kans. Ent. Soc., 15, p. 53), and this appears to be the only record of local occurrence for the species.

76. **P. tusa** (Horn). Trans. Am. Ent. Soc., 14:290, 1887 **(Lachnosterna).**
A rather small moderately elongate species, pale yellowish with a contrasting black head. Originally described from material collected near San Antonio. Males fairly numerous at light; female not taken. Dimmit County. April 7 to September 6.

77. **P. (Listrochelus) bottimeri** Reinhard, n. sp. Brewster County, June 10, 1948.
Six specimens taken at light, Big Bend National Park.

78. **P. (Listrochelus) chapini** Saylor. Proc. U. S. Nat. Mus., 89:84, 1940.
Two males (determined by Dr. M. W. Sanderson) labeled as follows: "Chisos Mts., Brewster Co., Texas, VII-9/12, 1948, 5260 ft. Pinon-

juniper oak association. At light. F. Werner and W. Nutting".

79. **P. (Listrochelus) mucorea** (Leconte). Jour. Ac. N. S. Phil., (2), 3:263, 1856 **(Listrochelus). P. (Listrochelus) texanus** Leconte, is a synonym according to Saylor (Proc. U. S. Nat. Mus., 89:86).

A rather common moderately robust species with elytra and thorax distinctly pruinose in well preseved specimens. Taken only at light. Brazos, Travis, Frio, Dimmit, Zavala, Val Verde, Presidio, Kimble, Menard, Runnels, Howard and Midland Counties. March 5 to May 1.

80. **P. (Listrochelus) pulcher** (Linell). Proc. U. S. Nat. Mus., 18:730, 1896 **(Listrochelus).**

Very similar in general aspect to the preceding species but readily distinguished in the male by the genital characters. Fairly abundant at light. Van Zandt, Kaufman, Milam, Erath, Bee and Bexar Counties. March 18 to May 21.

81. **P. (Listrochelus) reinhardi** Saylor. Proc. U. S. Nat. Mus., 89:89, 1940.

Occurs in the Lower Rio Grande Valley, which is the type locality. Closely allied to **mucorea** and **pulcher,** but readily separated from both by the genitalia in the male and pygidial characters in the female. Taken in moderate numbers at light. March 3 to April 29.

82. **P. (Listrachelus) scuticeps** (Bates) Biol. Centr. Amer., 2, (2):171, 1888 **(Listrochelus).**

A small reddish brown species with shining thorax and pruinose elytra. Described from Mexico and rare in the local fauna. Two specimens, Presidio County, June 28 and July 17, 1930 (W. L. Owen).

83. **P. (Listrochelus) fimbripes** (Leconte). Jour. Ac. N. S. Phil., (2), 3:264, 1856 **(Listrochelus).**

One female taken at Ft. Davis, June 11, 1948 (at light) by L. J. Bottimer apparently belongs here.

"New Braunfels", Comal County, (Saylor, Proc. U. S. Nat. Mus., 89, p. 97).

84. **P. (Listrochelus) koehleriana** Saylor. Proc. U. S. Nat. Mus., 89:99, 1940. "S. Texas" (Saylor, loc. cit., 89, p. 100).

85. **P. (Listrochelus) parilis** (Bates). Biol. Centr. Amer., 2, (2):172, 1888 **(Listrochelus).**

"Davis Mountains, July 9, 1921, C. D. Duncan" (Saylor, Proc. U. S. Nat. Mus., 89, p. 102).

86. **P. (Listrochelus) planeta** Reinhard, n. sp. Jeff Davis County, June 11, 1948.

One pair taken at light by L. J. Bottimer at Ft. Davis.

87. **P. (Listrochelus) texensis** Saylor. Proc. U. S. Nat. Mus., 89:106, 1940.

A small deep reddish brown species with distinctive male genital and claw characters. Not common. Ranges from the Rio Grande Valley (type locality) northwestward to Uvalde, Val Verde, Nolan and Howard Counties. May 21 to August 4.

88. **P. (Listrochelus) wickhami** Saylor. Proc. U. S. Nat. Mus., 89:107, 1940.

Three specimens from Castolon, Brewster County, June 1 and 11, 1928 (F. F. Bibby); this material constitutes part of the type series. Saylor (op. cit., p. 108) also records the species from Presidio County.

89. **P. (Listrochelus) cushmani** Saylor. Proc. U. S. Nat. Mus., 89:109, 1940.
Occurs in Presidio, Brewster and El Paso Counties. Three specimens; June 14 to August 20.

90. **P. (Listrochelus) macmurryi** Saylor. Proc. U. S. Nat. Mus., 89:110, 1940.
A small compact pale yellow species with rather dense longish hairs on the entire upper surface. Five specimens from Austin, Travis County (one designated as allotype) and one from Mason County, all taken at light. April and August.

91. **P. (Listrochelus) arizona** Saylor. Proc. U. S. Nat. Mus., 89:112, 1940.
"Fedor", Lee County (Saylor, op. cit., p. 112).

92. **P. (Listrochelus) senex** (Horn). Trans. Am. Ent. Soc., 7:148, 1878 **(Listrochelus).**
An apparently rare species locally; originally described from one specimen, probably from the Llano Estacado, Texas. "Fort Clark", Kinney County (Saylor, Proc. U. S. Nat. Mus., 89, p. 115).

93. **P. (Phytalus) trichodes** (Bates). Biol. Centr. Amer., 2, (2) :178, 1890 **(Phytalus).**
A robust pale yellowish brown hairy species, readily distinguished from allied forms by the items listed in the accompanying key. Five specimens, all taken at light. Hidalgo, Cameron and Val Verde Counties. May and July.

94. **P. (Phytalus) obsoleta vanalleri** (Schaeffer). Bull. Brk. Ent. Soc., 22:215, 1927 **(Phytalus).**
Similar to the preceding species in color but more elongate in build and the elytra glabrous. Not very common. Taken only at light. Limestone, Nacogdoches, Smith and Morris Counties. June.

95. **P. (Phytalus) nosa** Blackwelder. Checkl. U. S. Nat. Mus. Bul., 185 (2) :225, 1944. New name for **Phytalus aegrotus** Bates, Biol. Centr. Amer., 2, (2) :182, 1888, preoccupied.
"One male, Laredo, Texas, June 5, 1932, C. E. White." (Sanderson, Jour. Kans. Ent. Soc., 15, p. 54).

96. **P. (Chlaenobia) vexata** (Horn). Trans. Am. Ent. Soc., 12:121, 1885 **(Phytalus).**
A small moderately elongate pale yellowish species described from Texas without precise locality. The tarsal segments are moderately to densely pilose beneath, especially in the male. Three specimens taken at light. Hidalgo County, June, July and August.

## CADDIS WORMS ATE THE CABBAGE

H. B. HUNGERFORD

Doctor R. H. Beamer and the entomological survey party from the University of Kansas were camped by a cold stream near Tajique, New Mexico, in June 1941. They placed their cabbage in the cold water to keep it fresh. When they returned for it numerous Caddis fly larvae were eating the cabbage. Burton Hodgden collected many of these larvae and presented them to me. Recently I sent samples to Doctor Herbert H. Ross who reports that the large larvae are **Hesperophylax** sp. and the numerous smaller kind belong to **Lepidostoma** sp.

# CONTRIBUTIONS TO THE KNOWLEDGE OF THE PSYLLIDAE OF MEXICO (PART II)[1]

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In Part I of this series, on the Triozinae, the author neglected to include in the discussion any consideration of several of the species recently described by Caldwell which were included in the key. These species are **Trioza apartata, T. epiphitatae, T. stroma, T. hidalgoensis, T. rugosata, T. zogoda** and **T. thoracia. Trioza thoracia,** based on one specimen taken near Mexico City, November 24, 1938, was described in the Ohio Journal of Science 41:423, 1941. The other species were all described in the Ohio Journal of Science 44:57-62, 1944. Subsequently several additional new species and a new genus of Triozinae from Mexico have been described by Caldwell in the Journal of the New York Entomological Society 52: 335-341, 1944. These are **Trioza rhinosa, Kuwayama striata, K. hyalina, K. mexicana, K. lateralis** and **Optomopsylla formiciformis.**

## Part II - Subfamily Carsidarinae

1882 **Prionocnemidae** Scott, Trans. Ent. Soc. London 1882:366.
1886 **Prionocnemina** Löw, Verh. Zool. Bot. Ges. Wien 36:160.
1910 **Ciriacreminae** Enderlein, [**pro parte**] Ergeb. Schwed. Exped. Kilimandjaro 2:138.
1911 **Carsidarinae** Crawford, Pom. Coll. Jour. Ent. 3:481.

The name **Prionocneminae** which has clear priority may not be used for this group as there is no genus **Prionocnemis** in the family Psyllidae.

This subfamily is predominantly tropical in distribution. Several genera have been described from the paleotropics which are as yet unknown from the new world.

The principal character on which this subfamily has been based is the deeply excavate anterior margin of the head, usually the vertex, but in some genera the anterior portion of the head is composed of the genae. The genera grouped together on this basis show great variation in other characters and it seems probable that when the tropical fauna is more completely known a realignment of the genera will be necessary.

### Key to the genera of Carsidarinae

1. M and Cu of forewing with common petiole ..... 2
   M and Cu of forewing without common petiole ..... 4
2. Forewings with pseudovein between M and Rs at furcation of M ..... **Carsidara**
   Forewings without pseudovein ..... 3
3. M and Rs of forewing separate throughout; perostigma present ..... **Coelocara**
   M of forewing touching Rs about midway; pterostigma lacking ..... **Epicarsa**
4. Cu of forewing arising separately from the basal vein, Rs and M fused to near the apex of wing; metanotum with a pair of truncate conical processes ..... **Synoza**
   R, M and Cu of forewing all arising from basal vein at same point; metanotum without dorsal processes ..... **Rhinopsylla**

[1] Part I. Kans. Ent. Soc., Jour. 17:143-169, 1944 and 18:1-29, 1945.

## Genus Carsidara Walker

1869 **Carsidara** Walker, Linn. Soc. London, Jour. and Proc. 10:329.
1882 **Carsidara** Scott, Trans. Ent. Soc. London 1882(3):466.
1911 **Carsidara** Crawford, Pom. Coll. Jour. Ent. 3:484.
1914 **Carsidara** Crawford, U.S. Nat. Mus., Bull. 85:57.

Head narrower than thorax, short. Vertex very short medially. Medial suture prominent. Genae forming front of head, strongly produced, hence head deeply "cleft" anteriorly. Genae covering frons completely. Median ocellus anterior or on dorsal surface of head. Eyes large, hemispherical. Antennae long, slender. Beak very long. Thorax quite flat. Pronotum scarcely declined anteriorly, with foveae on each side. Forewings long, slender, angulate apically, prominent pterostigma, basal vein short, M and Cu with common petiole, pseudovein between Rs and M at furcation of M, medial cell much larger than cubital. Metatibiae with large basal spur. Metatarsi with 1 (outer) black claw on proximal segment.

Haplotype: **Carsidara marginalis** Walker.

Walker's description of the genus is inadequate. Scott working with Walker's material gives a much more adequate description and several figures. Several specimens in the Bishop Museum and the collection of the Hawaiian Sugar Planters' Experiment Station agree with the descriptions of **C. marginalis** Walker. They are from Larat rather than Celebes but I feel certain that they are Walker's species. The principal difference between these specimens and **C. dugesii** is in the position of the median ocellus. In the latter species it is on the dorsal side of the head while in **marginalis** it is anterior. Except for this the species are quite similar and appear to be truly congeneric.

### Carsidara dugesii Löw

1886 **Carsidara dugesii** Löw, Verh. Zool. Bot. Ges. Wien 36:160.
1911 **Carsidara gigantea** Crawford, Pom. Coll. Jour. Ent. 3:486.
1911 **Carsidara rostrata** Crawford, Pom. Coll. Jour. Ent. 3:486.
1911 **Carsidara mexicana** Crawford, Pom. Coll. Jour. Ent. 3:487.
1923 **Carsidara gigantea** Laing, Ann. and Mag. Nat. Hist. IX, 11:698.
1923 **Carsidara dugesii** Laing, Ann. and Mag. Nat. Hist. IX, 11:698.
1928 **Carsidara gigantea** Ferris, Can. Ent. 60:244.
1941 **Carsidara gigantea** Caldwell, Ohio Jour. Sci. 41:421.

Length to tip of folded wings 3.5 to 4.5 mm.

**Color:** General color yellowish with lines on the thoracic dorsum, sulci on head, apical portion of antennal segments, brown. In very dark specimens general color brown with lines on thoracic dorsum, basal parts of antennal segments, ridges on vertex, tarsi and margins of abdominal segments yellow. Forewings hyaline or slightly fumate especially on pterostigma. Hind wings somewhat milky.

**Structure:** Head large, narrower than thorax. Vertex narrow with two large, oblique sulci from disc to antero-lateral angles, medial suture very prominent, lateral margins strongly raised, foliaceous anteriorly, lateral ocelli on outer side above base of compound eye. Anteriorly vertex and genae sharply excavate, antennae on obliquely truncate lateral portions. Median ocellus on dorsal side of head. Genae not produced ventrad except for very small conical projections below eyes, extending far dorsad. Eyes large, rounded. Antennae 3.75 times as long as width of head, slender, not as long as body. Thorax arched. Pronotum long, not depressed strongly anteriorly. Mesoscutum flat dorsally. Metanotum with two small but distinct

dorsal processes. Forewings large, 2.66 times as long as wide, bluntly angled apically; basal vein short, M and Cu with common base shorter than R, medial cell much larger than cubital, Rs angled slightly before furcation of M, pseudovein connecting Rs and M at this point, pterostigma prominent. Hind wings large, about 0.7 as long as forewings. Metatibiae with large basal spur, 1 outer and 4 inner apical spines. Metatarsi with 1 outer claw on proximal segment.

Male proctiger of moderate length, strongly produced caudad basally, remainder slender, tubular with several long setae near apex. Forceps somewhat longer than proctiger, slender, slightly twisted, somewhat enlarged before apex then incurved to small blunt tooth. Dorsal margin of subgenital plate produced as falciform process 0.5 as long as forceps. Female genital segment about as long as rest of abdomen, stout, cluster of long setae on apical half; dorsal valve with distinct suture about midway then sharply narrowed, attenuate and somewhat upturned apically, ventral valve slender and upturned apically, slightly longer than dorsal.

Originally described by Löw from specimens collected on a malvaceous plant by Alfred Dugés, this species is apparently common throughout the country at all seasons of the year. Specimens are at hand with data as follows: San Jacinto, D. F., swept from luxuriant growth of weeds **Datura**, **Amaranthus**, **Rumex**, **Bidens**, etc. September 10, 1923, swept from **Melilotus** March 18, 1929, swept from alfalfa June 13, 1929, swept from weeds along experimental plots September 24, 1929, on light April 28, and September 28, 1932; Popatla, D. F., swept from a luxuriant growth of weeds July 8, 26, August 7 and 12, 1924; Chapultepec Park, D. F., on **Malva** February 24, 1924 including teneral specimens and nymphs, from deciduous bush over weeds including **Fragaria** and **Vinca** May 19, 1932; Lomas de Chapultepec, swept from flowers of **Schinus molle** May 25, 1938; Mixquic, D. F., swept on weeds along a canal June 18, 1938; Mexico City, D. F., July 2, 1932; Xochimilco, D. F., swept **Salix**, **Urtica**, **Eichornia**, etc. from a boat September 30, 1923; Chimalhuacan on Lake Texcoco east of Mexico City, swept from weeds in a garden, October 21, 1923; Chapingo, swept from alfalfa in bloom, April 30, 1924; Yurecuaro, railway station on the Mexico—Guadalajara line, at light, July 31, 1934; Madereros near Piedras Negras, Veracruz, railway station near the Rio Blanco 55 km. from Veracruz, swept from beans December 18, 1926; Veracruz, Veracruz, La Forestal between the dunes and seashore, at light in swampy grassland, December 19, 1926; El Chico, Hidalgo, swept from weeds along road, September 15, 1938; Colima, Colima, swept from weeds along a brook and from beans growing between corn, January 27, 1930; Sentinela, coast of Colima near the border of Jalisco swept from cotton, January 28, 1930; El Dorado, Sinaloa swept from tomatoes, March 22, 1932; Santa Engracia, Tamaulipas, at light, December 13, 1936, C. C. Plummer; Chiltepec, Oaxaca, swept from low vegetation in virgin forest December 10, 1937; Tuxtla Gutierrez, Chiapas, swept from shrubs in dense forest, May 30, 1926; San Cristobal Las Casas, Chiapas, swept from luxuriant growth of weeds June 9 and 27, 1926; Mapastepec, Chiapas, at light, bush and grassland, December 7, 1932; Finca Vergel, Chiapas, on light in virgin forest, June 13, 1935; San Martin, Mexico, May 25, 1932, E. G. Smyth. Additional specimens are at hand from La Ceiba, Honduras, September 24 and 26, 1916

and October 18, 1916. Additional records are: Teapa, Tabasco (Laing); Mouth of Balsas River, Guerrero and Minatitlan, Vera Cruz (Ferris); Iguala, Guerrero (Caldwell).

In the large series of specimens examined I find all the variations in color and size recorded by Crawford for his species **mexicana** and **gigantea.** At my request Louise M. Russell of the U.S. National Museum has compared specimens of **dugesii** with the types of **gigantea** and reports that she can find no differences which in her opinion are of specific significance.

Host: **Malva** sp.

### Genus **Coelocara** Tuthill

1899 **Freysuila** Schwarz, Proc. Ent. Soc. Wash. 4(3):195.
[non]**Freysuila** Aleman, La Naturaleza 1(2):21, 1891.
1914 **Freysuila** Crawford, U. S. Nat. Mus., Bull. 85:54.
1944 **Coelocara** Tuthill, Ent. News 55:93 [**nomen nudum**].
1945 **Coelocara** Tuthill, Ent. News 56:237.

Large robust species. Head broad, short, narrower than thorax, strongly excavate anteriorly. Lateral ocelli on large protuberances. Genae swollen ventrally, slightly produced as acute or blunt processes. Frons entirely visible as long narrow sclerite. Antennae as long as body or longer. Third segment of antennae large, thick, tapering apically, rest of antennae slender. Eyes small, set far forward on head. Thorax large. Pronotum broad, not deflexed anteriorly. Mesonotum flat. Metanotum with median protuberance. Forewings large, membranous, broadly rounded apically; pterostigma present, M and Cu with long common base, cubital cell elongate, larger than medial. Hind wings large. Legs large. Metathoracic femora with tuft of slender setae apically. Metatibiae without basal armature. Proximal segment of metathoracic tarsi with 2 black claws. Genitalia varied.

Orthotype: **Coelocara schwarzi** Tuthill

Schwarz described this genus in 1899 (**loc. cit.**) but erroneously thought it to be identical with **Freysuila** Aleman. The latter is a member of the subfamily Psyllinae. Three species of **Coelocara** are known, two of which occur in Mexico. All three inhabit species of **Cedrela.** Ferris also records **Ficus** sp. as a definite host of **C. schwarzi.** The nymphs and some of the adults are covered with a cottony secretion. As no types were selected by Schwarz lectotypes have been selected for the three species from his cotypic material.

The species **C. cedrelae** (**Freysuila dugesii** var. **cedrelae** Schwarz, **loc cit.**) is based on a series of specimens from Trinidad and has been recorded from Panama by Laing (Ann. and Mag. Nat. Hist. IX, 11:698, 1923). A male from the type series has been selected as type and is in the United States National Museum—no. 14822. This form differs from the other two species in that the third segment of the antenna is 2.5 times as long as the fourth. The forceps of the male resemble those of **schwarzi** but the lateral lobes scarcely extend caudad. The female genital segment is similar to that of **schwarzi.**

### Key to species of Coelocara

Female genital segment nearly as long as rest of abdomen; forceps of male bilobed; segment three of antennae 1.6 times as long as segment four ..... **schwarzi**

Female genital segment very short; forceps of male simple; segment three of antennae scarcely longer than segment four ..... **ernstii.**

## Coelocara schwarzi Tuthill

(Fig. 1, 2, 3)

1899 **Freysuila dugesii** Schwarz, Proc. Ent. Soc. Wash. 4(3):195.
[non]**Freysuila dugesii** Aleman, La Naturaleza 1(2):21-26, 1891.
1914 **Freysuila dugesii** Crawford, U. S. Nat. Mus., Bull. 85:55.
1928 **Freysuila coahuayanae** Ferris, Can. Ent. 60:111 (pro parte).
1945 **Coelocara schwarzi** Tuthill, Ent. News 56:237.

Length to tip of folded wings 5 mm.

**Color:** General color yellowish, more or less marked with dark brown. Antennae, veins of forewings and legs darker. Metanotal process black. In well pigmented specimens four brown stripes on thorax and abdomen mostly brown.

**Structure:** Body surface finely rugose. Head small. Vertex nearly flat except for protuberances bearing lateral ocelli, deeply excavate anteriorly as far as anterior margin of eyes, smoothly rounded down to elongate frons. Median ocellus ventral. Genae swollen ventrally with slight protuberance. Antennae arising from obliquely truncate lateral portions of vertex, 4 times as long as width of head; three proximal segments thick, remaining seven slender; four basal segments densely pubescent; III 1.6 as long as IV. Eyes small, set far forward, extending forward beyond lateral margin of vertex. Thorax broad, somewhat flattened. Pronotum short, rounded down anteriorly, broadly excavate posteriorly. Forewings large, hyaline, broadly rounded, 2.5 times as long as wide; basal vein very short, M + Cu much shorter than R, pterostigma short and broad (3 times as long as wide), Rs long, curved to costa, M strongly arched before furcation, $Cu_2$ short, $Cu_1$ very long, arched. Hind wings 0.66 as long as forewings. Legs pubescent. Metatibiae with 7 apical spines.

Male proctiger stout, caudal margin narrowed apically. Forceps 0.5 as long as proctiger, bipartite; large caudal lobe near apex laterally, top of medial lobe visible in lateral view, medial lobe rounded dorsally, produced caudad to sharp black apex, shorter than lateral lobe. Female genital segment long, nearly as long as rest of abdomen, dorsal valve evenly concave dorsally to blunt apex; ventral valve much shorter than dorsal, acute.

In examining undetermined material from the United States National Museum I encountered several vials containing dried specimens. One of the vials contained the type material of **Freysuila dugesii** Aleman to be discussed under that species. Two others contained adults and nymphs of the species described by Schwarz as **Freysuila dugesii** and **F. dugesii** var. **ernstii.** A male from the former material is designated as the type of **Coelocara schwarzi** and an accompanying female as allotype. The data is as recorded by Schwarz, i. e., "Psyllid on **Cedrela Dugesii,** Guanajuato, Mexico, collected by Dr. Eugene Dugés." The type is in the United States National Museum—no. 58219.

I have at hand the type specimens of Ferris' species **coahuayanae.** The females are identical with **ernstii** which was originally described from Venezuela. The male which he mentions as dissected from a nymph is a male of **schwarzi.** Although somewhat fragmentary the genitalia are undoubtedly those of **schwarzi.** This male and the accompanying nymphs were not taken with the females which he described in detail but on a different host and at a different locality. Ferris states that they were assigned to **coahuayanae**

because the nymphs are identical. This is not correct. The nymphs although quite similar are distinct. The most obvious difference is in the antennae. The antennal segments of the nymphs show proportions similar to those of the adults. The third antennal segment on **schwarzi** is nearly twice as long as the fourth whereas in the nymphs of **ernstii** the third and fourth segments are nearly equal. The details of the abdominal pore pattern are also different.

In addition to the type material and Ferris' specimens one female is at hand from Tuxtepec, Oaxaca. A series of specimens in the United States National Museum from San Pedro Montes de Oca, Costa Rica, C. H. Ballou, August 5, 1932 and one male from Cuba appear to be this species but show some variations. The wings are shorter and more broadly rounded. The Costa Rican specimens are much more highly colored than any of the others seen, the pterostigma is shining black and opaque.

Hosts: **Cedrela** sp. and **Ficus** sp.

### Coelocara ernstii (Schwarz)

(Fig. 4, 5, 6)

1899 **Freysuila dugesii var. ernstii** Schwarz, Proc. Ent. Soc. Wash. 4:197.
1914 **Freysuila ernstii** Crawford, U.S. Nat. Mus., Bull. 85:55.
1928 **Freysuila coahuayanae** Ferris, Can. Ent. 60:111-113, figs. [**pro parte**].
1944 **Coelocara ernstii** Tuthill, Ent. News 55:93.

Length to tip of folded wings 5 mm.

**Color:** Yellowish green. Antennae, veins of forewings darker. Metanotal process black.

**Structure:** Similar to **C. schwarzi.** Differing as follows: Anterior excavation of vertex less angular. Vertex swollen each side of medial suture. Basal segments of antennae less pubescent, third segment only slightly longer than fourth. Pronotum not excavate posteriorly. Pterostigma longer, 8 times as long as wide. M + Cu of forewing slightly longer than R.

Male proctiger short, roundly produced caudad. Forceps short; in lateral view nearly straight, broad basally, apical half narrowed; in caudal view broad basally, much enlarged at middle, truncate apically with sharp, black tips touching. Female genital segment short, ventral valve resembling last abdominal sternite, not produced; dorsal valve sharply descending, blunt apically.

Cotypes of **C. ernstii** have been examined and one of the males is here designated holotype — no. 14821 United States National Museum.

I have at hand the type material of **Freysuila coahuayanae** and Ferris find the females to be identical with **ernstii.** The male is referred to **C. schwarzi** as is indicated under the discussion of that species. The nymph figured by Ferris is that of **ernstii.**

This species was originally described from specimens from Venezuela taken on **Cedrela** sp. Mexican specimens are at hand with the following data: Chiltepec, Oaxaca, March 3, 1932 (trap light); Ciudad del Carmen, Campeche, January 26, 1939 (at light); Tuxtepec, Oaxaca; Coahuayana, Michoacan, on **Cedrela** sp., January 11, 1926, G. F. Ferris (**coahuayanae**). I also have specimens from Guatemala and Cuba.

Host: **Cedrela** spp.

## Genus **Epicarsa** Crawford

1911 **Epicarsa** Crawford, Pom. Coll. Jour. Ent. 3:488.

Only one species of this very distinctive genus is known — **E. corniculata** Crawford. Originally described from Para, Brazil, from one male specimen, it has been recorded from Mexico by Ferris (Can. Ent. 60: 244), who collected his specimens from **Ceiba** sp. at Petatlan, Michoacan and the mouth of the Balsas River, Guerrero. As he indicates, there must remain some question as to the identity of these specimens until more is known of the South American insect. No specimens of this genus occur in the material at hand from Mexico.

The most distinctive character of this genus is the peculiar venation of the forewing which is figured by Crawford (**loc. cit.**)

## Genus **Synoza** Enderlein

1918 **Synoza** Enderlein, Zool. Jahr., Abt. f. Syst. 41:479.

Head narrower than thorax. Vertex with prominent medial suture, very deeply excavate anteriorly, smoothly continuous with genae. Genae not swollen ventrally, covering frons except for small ventral portion bearing median ocellus. Clypeus small. Eyes small, directed anteriorly. Antennae large and long, heavily setate, basal segment very large. Thorax strongly arched. Pronotum small. Mesothoracic prescutum very strongly arched, vertical anteriorly. Mesoscutum flat dorsally. Mesopleurites very strongly developed. Mesocoxae far back against metacoxae. Postscutellum of metathorax with two large dorsal processes, obliquely truncate apically. Forewings large, membranous, broadly rounded apically; clavus very small, basal vein long, $R_1$ and Cu arising from basal vein at same point, Rs and M fused to near apex, marginal cells large, cubital larger than medial, no pterostigma present. Hind wings moderately large, venation very weak. Legs large, stout. Pro- and mesotibiae with brush of stout setae apically. Metatibiae without basal armature, with numerous short, stout, closely set apical spines. Proximal segment of metatarsi with two black claws.

Type of genus: **Synoza cornutiventris** Enderlein.

The peculiar wing venation sets this genus apart from all others known. The metothoracic protuberances and the tibial combs are also distinctive. The antennae of the species at hand appear to be only nine segmented due to the minute size of the tenth segment.

The type species was based on one female from Peru.

### Key to the species of Synoza

Base of Cu of forewing arising from principal vein at almost 90° angle, $Cu_1$ not reaching to furcation of Rs and M ..... **pulchra**

Base of Cu of forewing arising from principal vein at approximately 45° angle, $Cu_1$ extending beyond furcation of Rs and M ..... **floccosa**

### **Synoza pulchra** Laing

(Fig. 7)

1923 **Synoza pulchra** Laing, Ann. and Mag. Nat. Hist. IX, 11:696.

Described by Laing from a male collected at Chilpancingo, Guerrero. One female from Carrizal, Vera Cruz, August 6, 1932 collected by R. Ruiz Soto appears to be this species. Although it differs considerably in coloration from that recorded by Laing it is the same structurally so far as can be determined.

It is somewhat teneral. The female genital segment is very large, about as long as the rest of the abdomen in the dried specimen. The dorsal valve is very large and bulbous, with two small medial lobes on caudal surface. The ventral valve is flat along the ventral surface, enlarged and upturned somewhat at apex. Anus very small and set far back on dorsal valve, with simple marginal pore ring.

Host: Unknown.

### Synoza floccosa Ferris

(Fig. 8)

1928 **Synoza floccosa** Ferris, Can. Ent. 60:109.

Length to tip of folded wings 6 mm.

**Color:** General color light green shaded with yellow. Antennae dark brown except segments I, II and base of III, IV, V and VII. Wings hyaline.

**Structure:** Body sparsely covered with long setae, surface very smooth and shiny. Head small. Vertex angularly emarginate behind, lateral ocelli on raised areas, medial anterior excavation very deep, protruding laterally to form part of large antennal base, smoothly continuous with genae. Median ocellus small, ventral. Antennae very large, longer than body, heavily setate, transversely rugose, first segment very large, tenth very small. Eyes small, far forward on head, postocular area as long as eye. Pronotum short, vertical. Prescutum bulbous, perpendicular anteriorly. Mesopleurites very large. Prothoracic legs when drawn up lying in trough of mesothorax. Anterior spiracle large, visible on anterior side of mesopleural prominence. Forewings large, 2.5 times as long as wide, anal margin sharply bent near $Cu_1$; venation typical of genus, $R_1$ straight, directed slightly toward base of wing, Cu leaving basal vein at 45° angle, base of Cu very short, cubital cell very large, somewhat elongate, $Cu_1$ extending far down wing beyond base of Rs. latter straight, branches of M even. Hind wings 0.6 as long as forewings. Pro- and mesothoracic tibiae with several short stout setae at apex. Apical setae of metatibiae short, closely placed. Meracanthi small.

Male proctiger stout, nearly straight, flexed caudad apically. Forceps shorter than proctiger, deeply incised apically, caudal lobe rounded, cephalic sharp, black-tipped. Female genital segment more than 0.5 as long as rest of abdomen, slender, with many long slender setae; dorsal valve evenly rounded down from anus to sharp tip; ventral valve slender, longer than dorsal, truncate apically. Anus very large.

The type series, which includes nymphs, was taken from **Ficus** sp. near Colima by G. F. Ferris. Three females are at hand from Tepic, Nayarit, collected March 14, 1927, swept from bushes along a brook at 950 meters.

Host: **Ficus** sp.

**Holotype,** male, near Colima, on **Ficus** sp., January 1926, in G. F. Ferris Collection.

Klyver (Can. Ent. 62: 175, 1930) erroneously considered this species a synonym of **S. pulchra** Laing. Both Laing and Ferris gave accurate figures of the forewing which show distinctive characters as indicated above.

### Genus **Rhinopsylla** Riley

1885 **Rhinopsylla** Riley, Proc. Biol. Soc. Wash. 2:77.
1911 **Rhinopsylla** Crawford, Pom. Coll. Jour. Ent. 3:440.

Head wide, short, strongly narrowed behind eyes. Vertex with prom-

inent medial suture, more or less prominent discal sulci, angularly emarginate anteriorly. Genae smoothly rounded up to vertex, covering frons, with slight ventral epiphysis. Median ocellus between antennal bases, anterior. Antennae of moderate length, enlarged basally, segments III, IV and V white, remainder dark. Postocular area large. Eyes small, far forward. Thorax moderately arched. Pronotum long, scarcely descending anteriorly, strongly emarginate behind. Proepisterna strongly produced anterolaterally. Forewings triozine in venation, angular apically. Hind wings well developed. Legs large. Prothoracic femora very large in some species, not so in others. Metatibiae with 1 outer and 2 inner apical spines. Basal segment of metatarsi without claws. Meracanthi large. Metacoxae strongly developed anteriorly between legs. Genitalia small. Male proctiger with caudal lobes. Ventral valve of female genital segment scarcely produced.

Haplotype: **Rhinopsylla schwarzi** Riley.

The species included in this genus show affinities to the members of the genus **Kuwayama** in the Triozinae as discussed under that genus. As more species are studied the distinction between the two genera becomes clearer.

The sharply emarginate head and the enlarged antennae indicate the relationship of this group to the other Carsidarinae. The wings are typical triozine in structure. The genitalia are quite distinct in type from those of **Kuwayama.** Although color is in general a very variable character the white basal portion of the antennae in this genus is very striking and is constant in all the species known to me.

Through the courtesy of J. S. Caldwell I have examined the unique type of **Rhinopsylla elongagena** Caldwell (Ohio Jour. Sci. 41: 424, 1941) and find it to be identical with **Kuwayama sincera** mihi. As it properly belongs in the genus **Kuwayama** it is referred to that genus as **Kuwayama elongagena** (Caldwell).

### Rhinopsylla antennata (Crawford)

(Fig. 9, 10, 11)

1910 **Paratrioza antennata** Crawford, Pom. Coll. Jour. Ent. 2:229.
1911 **Rhinopsylla antennata** Crawford, Pom. Coll. Jour. Ent. 3:441.
1911 **Rhinopsylla antennata proxima** Crawford, Pom. Coll. Jour. Ent. 3:441.
1923 **Rhinopsylla nigra** Laing, Ann. and Mag. Nat. Hist. IX. 11:698.
1938 **Rhinopsylla dimorpha** Caldwell, Ohio Biol. Surv., Bull. 34:246.
1941 **Rhinopsylla rubrafacia** Caldwell, Ohio Jour. Sci. 41:424.
1942 **Rhinopsylla antennata** Tuthill, Jour. Kans. Ent. Soc. 15:47.
1944 **Rhinopsylla nigra** Caldwell, Ohio Jour. Sci. 44:58.

Length to tip of folded wings 3 to 3.5 mm.

**Color:** Male, general color brown to black, venter and medial portion of dorsum of abdomen greenish white to yellow. Tibiae, tarsi, segments III, IV and V of antennae also white. Female, general color red to orange, considerable variation in extent of lighter markings on vertex, and thorax. Legs lighter, segments III, IV and V of antennae white. Abdomen in dark specimens chocolate brown with wide white dorsal stripe usually covered with wax, in lighter specimens red to green except for white dorsal stripe.

**Structure:** Head stout, slightly over twice as wide as long, cleft anteriorly but not deeply so. Vertex somewhat rounded down anteriorly, a more or less prominent oblique discal sulcus on each side, extending toward base of antenna. Eyes lateral. Genae swollen ventrally. Antennae from slightly over 2 to nearly 3 times as long as width of head, segments III and IV much

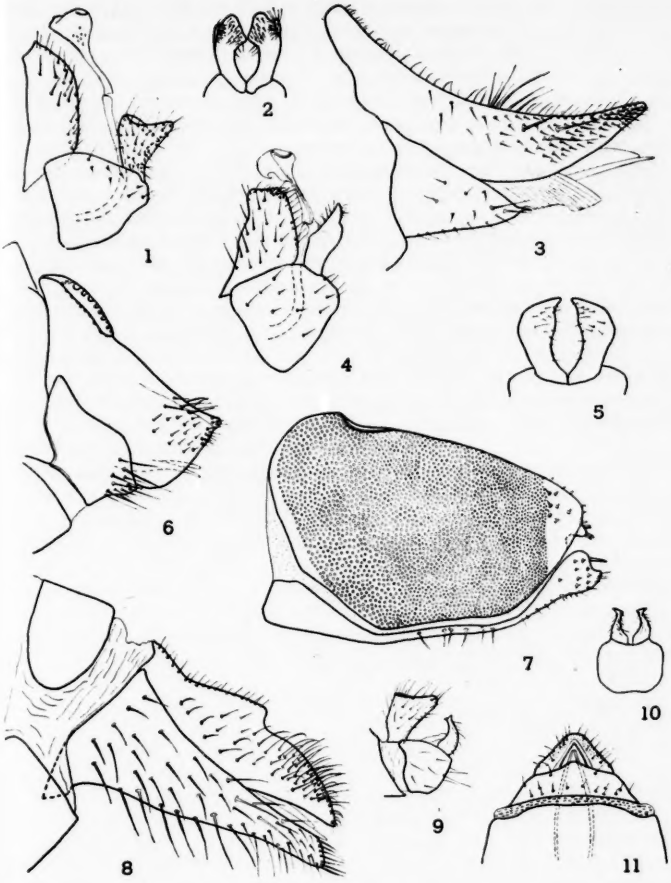


**PLATE I**

Fig. 1. **Coelocara schwarzi**—male cauda, lateral aspect.
Fig. 2. **C. schwarzi**—male forceps, caudal aspect.
Fig. 3. **C. schwarzi**—female cauda.
Fig. 4. **Coelocara ernstii**—male cauda, lateral aspect.
Fig. 5. **C. ernstii**—male forceps, caudal aspect.
Fig. 6. **C. ernstii**—female cauda.
Fig. 7. **Synoza pulchra**—female cauda.
Fig. 8. **Synoza floccosa**—female cauda.
Fig. 9. **Rhinopsylla antennata**—male cauda, lateral aspect.
Fig. 10. **R. antennata**—male forceps, caudal aspect.
Fig. 11. **R. antennata**—female cauda, ventral aspect.

thicker than remainder. Thorax slightly arched. Pronotum broader than vertex. Prothoracic episterna strongly produced. Forewings angulate, almost 3 times as long as broad, costal margin arcuate; Rs variable from short (just equalling $Cu_1$) and arched to costa to long (reaching furcation of media) and more or less sinuate; marginal cells about equal. Fore femora somewhat enlarged, short. Metatibiae with small basal spur, 2 inner apical spines. Metacoxae with anteriorly projecting processes.

Male proctiger short, with bluntly triangular caudal lobes. Forceps shorter than proctiger; in lateral view broad basally, evenly narrowed to apex, strongly curved cephalad; in caudal view slightly arched, tapered from base to truncate apex, apex with short, sharp lateral and medial processes, appearing somewhat T-shaped. Female genital segment short; ventral valve 0.66 as long as preceding sternite, broad, produced medially as small, blunt lobe; dorsal valve exceeding ventral, narrow, overhanging, apex dark, blunt; anus somewhat hourglass shaped, bordered by simple pore ring.

A large series of specimens at hand are undoubtedly **R. nigra** Laing. Dissection and careful examination of several males and females has disclosed no structural differences between them and specimens of **R. antennata** (Crawford). I have examined a female which has been compared with the type of **rubrafacia** by Caldwell and find it indistinguishable from the females of the above series. In none of the specimens examined have I found sclerite formation similar to that shown by Caldwell (1944) although in partially cleared specimens the pigmentation somewhat resembles his figures. If the type of **rubrafacia** has such structure it is probably a distinct species but I think it probable that Caldwell was misled by the pigment pattern and so include **rubrafacia** as a synonym of **antennata** but with some question.

Numerous specimens of this species are before me from all parts of Mexico, bearing data as follows: Swept from grass in open pine forest between Ajusco and Xitle volcanos, north of Mexico City, October 7, 1923; Chapingo, swept from flowering alfalfa, March 31, 1924 and from weeds bordering an irrigation ditch, May 24, 1924; Desierto de los Leones (3000 m.), swept from shrubs and low vegetation in the barranca del Rio Tepazulco, July 20, 1924; Chapingo, swept from high vegetation (**Tithonia**, **Brassica campestris**, etc.) in a fallow field, July 28, 1924; Cuichapa, Veracruz, swept from a shrub growing between stones in the bed of the Rio Blanco, November 7, 1924; Desierto de los Leones (2800 m.), on **Senecio salignus**, March 29, 1925; San Cristobal las Casas and vicinity, Chiapas, swept from various weeds and shrubs (2000 to 2700 m.), June 14 and 19, July 2, 12 and 17, 1926; Madereros, near Piedras Negras, Veracruz, swept from beans (**Phaseolus**), December 18, 1926; Hacienda Soledad, near Irapuato, Guanajuato, swept from irrigated alfalfa and from hygrophilous plants (**Scirpus**, etc.) bordering a pond, November 11, 1927; San Jacinto, D. F., swept from alfalfa, June 28, 1929, from turnips, July 17 and November 26, 1929, from weeds along a vegetable field, September 24, 1929, flying near sunset in calm weather November 8, 1929 (autumnal migrations), swept from **Brassica napus** 1929, at light, May 4 and September 28, 1932, swept from alfalfa recently cut, July 4, 1932; Hacienda Nijini, Ixtlahuaca Valley, Mexico, swept from young corn, July 1, 1931; Municipio de Pueblo Viejo, Veracruz, swept on weeds near the shore of Laguna Anahuac, at sea level, June 21, 1932, Salvador Flores collector;

Cuernavaca, Morelos, swept from low vegetation in an orchard (**Psidium** and **Mangifera**), February 20, 1933; San Pedro Yaneri, Oaxaca, June 19, 1937, Francisco Reyes collector; Jojulta, Morelos, swept from weeds growing between irrigated sugar cane plots, October 2, 1937; slopes of Monte Alto, northern part of the Mexican Valley, near Fernandez Leal, swept from low oak scrub, November 15, 1938; Mexico City on corn, 1938; Lagunas de Zempoala, Morelos, swept from low vegetation near the lake, August 18, 1939, and from grass, June 5, 1941; Llanos de Salazar, Mexico, swept from grass, November 12, 1939; Mount Telapon, Mexico, swept from grass on summit (3900 to 4000 m.), September 29, 1940; Chapultepec Park, Mexico City, swept from lawn with scattered trees and shrubs, June 15, August 10, October 28, 1941; Cerro Judio, D. F., swept from low oak bushes and mixed flowering weeds, August 15, 1943.

Host: **Polygonum** sp.

Type of **Rhinopsylla antennata**, male, no. 18082, United States National Museum.

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## A NEW SPECIES OF DELTANUS (HOMOPTERA-CICADELLIDAE)

R. H. BEAMER
University of Kansas, Lawrence

**Deltanus bicolor** n. sp.

Resembles **Deltanus texanus** (O. and B.) but general color of dorsum yellowish green on anterior two-thirds, without orange stripes. Length ♀ 5 mm.

**Structure:** Crown slightly concave, without transverse furrow, quite a little longer at middle than next eyes. Antennae one-third as long as body.

**Color:** Color of crown ivory with a round yellowish spot on disc either side of median line; pronotum and scutellum generally yellowish green, more or less mottled with ivory and with a semblance of a longitudinal stripe either side middle; elytra yellowish green on basal two-thirds, outer third black with three large, elongate clear areoles in a line crossing black area diagonally near its middle; venter of head black except lower portions of genae and circle on clypellus light; remainder of venter mottled with black.

**Genitalia:** Last ventral segment of female with lateral margins about one-third as long as median length, posterior margin slightly and broadly trilobed, underlying membrane produced into two rounded lobes almost as long as greatest length of median portion of segment.

Types: Holotype ♀ and 11 ♀ paratypes, 15 miles east of Creole, La., June 18, 1948, R. H. Beamer; 1 ♀ paratype Buras, La., June 21, 1948, R. H. Beamer.

Types in the Snow Entomological Collections.

# THE GENUS TINODES IN NORTH AMERICA

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Illinois Natural History Survey, Urbana, Illinois
and
DON R. MERKLEY
University of Utah, Salt Lake City, Utah

In 1871 McLachlan described **Tinodes consueta** from California, and since that time very little has been recorded about the genus in North America. Study of more recent collections has shown the presence of three species in the genus and has extended its range into Utah.

The genus **Tinodes** is predominantly a southern European genus, with scattered representation in the Oriental region. In addition to McLachlan's species, Navas has described two other species from the Neotropical region. Judging from illustrations of wing venation, these two latter are probably properly placed, but due to lack of illustrations of genitalic characters, it is impossible to give comparative remarks about them or establish their relationships. A study of available North American material has disclosed three species belonging to two fairly distinct groups within the genus. Each of these groups is represented in the fauna of southwestern Europe. The southerly distribution patterns of the species involved, and the abundant differences which exist between the related species of North America and Europe would indicate a separation of considerable geologic time, possibly antedating the Pleistocene.

The identity of McLachlan's species has been cleared up by Mr. D. E. Kimmins of the British Museum who examined the type of **consueta** and compared it with drawings used in this paper. Mr. Kimmins states that the type is unquestionably the species so illustrated here. We wish to express our gratitude to him for making these comparisons.

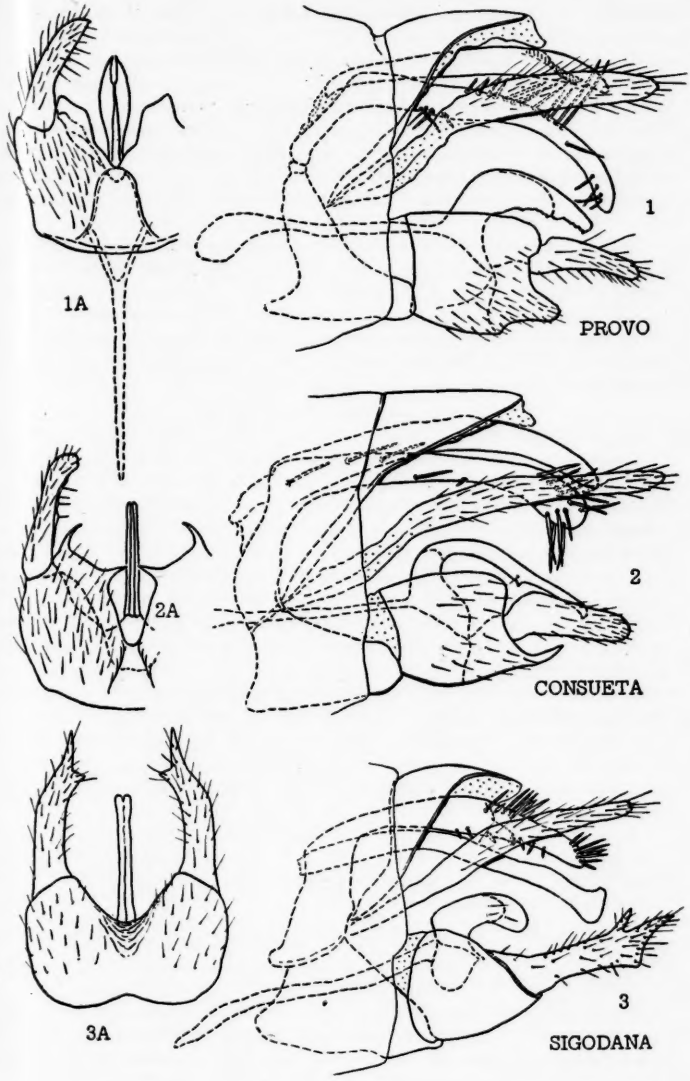
Unless otherwise indicated, types are in the collection of the Illinois Natural History Survey.

## Key to Nearctic Species-Males

1. Apical segment of clasper pointed and oblique at apex, with a dorsal spur; basal segment without posteromesal projections, fig. 3 ..... **sigodana**
   Apical segment of clasper somewhat sausage-shaped, rounded at apex and without projections; basal segment with large posteromesal flaps which extend beyond the base of the apical segments, figs. 1, 2 ..... 2
2. Flaps of basal segment of clasper oblique at apex, without processes; mesal process of clasper with lateral aspect short and deep, ventral aspect swollen, fig. 1 ..... **provo**
   Posteromesal flaps of basal segment of clasper with two long sharp spurs; mesal process of clasper with lateral aspect long and narrow, ventral aspect slender and linear, fig. 2 ..... **consueta**

### **Tinodes consueta** McLachlan

**Tinodes consueta** McLachlan, 1871, Jour. Linn. Soc. London, Zool. 11:138.


1A
1
PROVO
2A
2
CONSUETA
3A
3
SIGODANA

To supplement McLachlan's description we are adding the following description of the male genitalia, illustrated in fig. 2. General organization of parts typical for other members of the genus. Basal segment of clasper with quadrate lateral aspect, the ventral margin curving forward into a sharp point; apical segment short and rounded at apex; mesal process with elongate slender lateral aspect; the two claspers fused on meson with a broad apical V-shaped cleft between the apical free portion; posteromesal flap of basal segment fairly deep and ending in two sharp spur-like processes. Cerci elongate and slender. Aedeagus with unarmed lobe slightly curved and gently rounding at tip; setate lobe with some basal spines and two large clusters of long spines at apex.

McLachlan recorded the species from California, without additional data. I have seen additional material from Morgan Hill, California, September 6 and 17, 1939, collected by C. E. Mickel.

This and the following species appear to be members of the **manni** group but differ from **manni** and other related European species in the different shape of the claspers, especially the mesal lobe and the posteromesal flap of the basal segment of the clasper.

**Tinodes provo** new species

Male.—Length 8 mm., length of front wing 7 mm. Body and wings various shades of brown, usually lighter along the sutures. Maxillary palpi with third segment very long, twice length of fourth, and with second segment also comparatively long, subequal in length to the fourth; these palpal proportions are diagnostic for the genus. Front tibia without preapical spur. Wing venation typical for genus. Male genitalia as in fig. 1. Ninth tergite triangular, tenth apparently represented only by a membranous area at apex of ninth. Lateral aspect of clasper with basal segment deep and quadrate, with a broad posteroventral projection, apical segment small and rounded at tip, mesal process deep, short, curved, and with ventral margin irregularly serrate; ventral aspect, fig. 1**A**, with posteromesal flap of basal segment broad and obliquely truncate at apex, the two claspers fused for a considerable distance, and the two mesal processes together forming a bulbous unit. Cerci long and slender, rounded at tip. Aedeagus with unarmed lobe tapering evenly and gradually to apex; setate lobe with a scattering of short spines near base and apex, and with a row of very long spines and short spines on dorsal margin at middle.

Female.—Slightly larger than male but similar to it in color and general characteristics. Apical segments of abdomen typical for genus, produced into elongate and somewhat conical structure, much as in **Lype**, but not so extreme in its development.

**Holotype, male**—Provo River, Utah, Highway 89-91, at bridge August 10, 1947, D. R. Merkley.

**Allotype, female.**—Same data as for holotype.

**Paratypes.**—All from Utah; same data as for holotype, 1♂, 2♀♀; same data but July 5, 2♂♂; same data but July 17, A. R. Gaufin, 8♂♂, 8♀♀; same data but August 23, 1948, 3♂♂, 3♀♀; Midway, July 7, 1947, at light, A. R. Gaufin, 1♂; same data but July 15, 1♂; Midway-Heber Bridge, Provo River, July 21, 1947, 1♂; 1 mi. E. of Kimball's Junction, August 1, 1948, D. R.

Merkley, 1♂, 1♀; Wallsburg Bay Bridge, August 6, 1948, D. R. Merkley, 1♀. Paratypes deposited with the holotype, and in the collection of the University of Utah.

This species is most closely related to **consueta** from which it differs in the characters given in the key.

**Tinodes sigodana** new species

Male.—Length 6.5 mm., length of front wing 4.5 mm. Head and thorax dark brown, appendages light brown, wings smoke brown. General structure of mouthparts, legs, and wings typical for genus. Male genitalia as in fig. 3. Ninth tergite moderately short and triangular. Lateral aspect of clasper with basal segment somewhat triangular, the dorsal extent being very short; apical segment elongate, fairly heavily sclerotized with a sharp dorsal spur just before apex, the apical margin itself slightly concave, and the tip of the segment sharp; mesal lobe short and thick. Claspers fused on meson and without any posteromesal processes. From ventral view the apical segment of the clasper has a sharp narrow apical point and a broad sharp mesal point; the two mesal processes are slender and linear. Cerci long and slender tapering from near middle to a narrow apex. Aedeagus with unarmed lobe narrow and sinuate, enlarged at tip; setate lobe with scattered short ventral spines and two dorsal clusters of longer spines, one just beyond the middle and one at apex.

**Holotype, male.**—San Gabriel Mts., California, June 29, L. J. Milne.

This species is most closely related to the **auripilis** McLachlan, described from Portugal. It differs in the shape of the lobes of the aedeagus and in the shape of the claspers, including the dorsal projection near the tip. These two seem to form a rather distinct group from all the other species of the genus, characterized by the elongate apical segment of the clasper.

**List of Illustrations**

Male Genitalia of **Tinodes**

Fig. 1.—**T. provo**, lateral aspect; claspers, ventral aspect. Fig. 2.—**T. consueta**, lateral aspect; **2A**, claspers, ventral aspect. Fig. 3.—**T. sigodana**, lateral aspect; **3A**, claspers, ventral aspect.

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## NOTES ON KANSAS BUTTERFLIES

STALLINGS AND TURNER

Caldwell, Kansas.

**Asterocampa clyton** (Bdv. & LeC.). We collected a series of this species near Ft. Scott, Kansas, in 1947, which appear to be typical. Specimens collected in Sumner County, Kansas, are of the race **texana** (Skin.).

**Hesperia metea licinus** (Edw.). Mrs. Stallings took a single specimen of this skipper in Barber County, Kansas, on May 2, 1948. It has not been reported in Kansas before this catch. We found it common in the Wichita Mountains of Oklahoma.

**Megathymus texana** B. & M. On June 7 and 8, 1947, we collected a series of this species from 10 miles east of Coldwater, Kansas, westward to Liberal, Kansas. This species has not previously been reported in Kansas. In Oklahoma we found this species from Buffalo westward to the New Mexico line.

# DELPHACODES DETECTA (VAN D.) AND A NEW CLOSELY RELATED SPECIES (HOMOPTERA-FULGORIDAE-DELPHACINAE)

R. H. BEAMER
University of Kansas, Lawrence

**Delphacodes detecta** (Van Duzee)

**Liburnia detecta** Van Duzee, Bull. Buff. Soc. Nat. Sci., V, p. 248 (1897).
**Liburnia circumcincta** Van Duzee, Bull. Buff. Soc. Nat. Sci., IX, p. 203 (1909).
**Megamelus vanduzeei** Crawford, Proc. U. S. Nat. Mus., Vol. 46, p. 622, 1914.

"Macropterous form: Broad and stout. Color soiled whitish; basal angles of the scutellum and beneath, especially in the female, quite strongly tinged with yellow. Face black; a longitudinal line in the middle of each compartment of the front and a shorter one on the cheeks fulvous, carinae white; basal fovae of the vertex pale, base of the scutellum, disc of the pleural pieces, some marks on the base of the vertex in the male, and the claws, blackish. The black on the base of the scutellum is mostly covered by the pronotum but on either side it is extended backward as a black line next to the patagia. Tergum black, the broad margins and a transverse band near the apex whitish in the male, fulvous in the female. Elytra whitish, nervures concolorous, the marginal heavy and brown around the apex; the inner apical areoles with a faint longitudinal fuscous cloud. Tips of the last segment of the connexivum black in the female. Length, male 3½, female 4 mm.

"The genital characters of the male are similar to those of **pellucida**; stiles quite broad, widely divergent, their apex rounded and a little twisted. All the pieces black except the edge of the anal tube.

"New York. Described from one pair received from Mr. E. B. Southwick, taken in New York City."

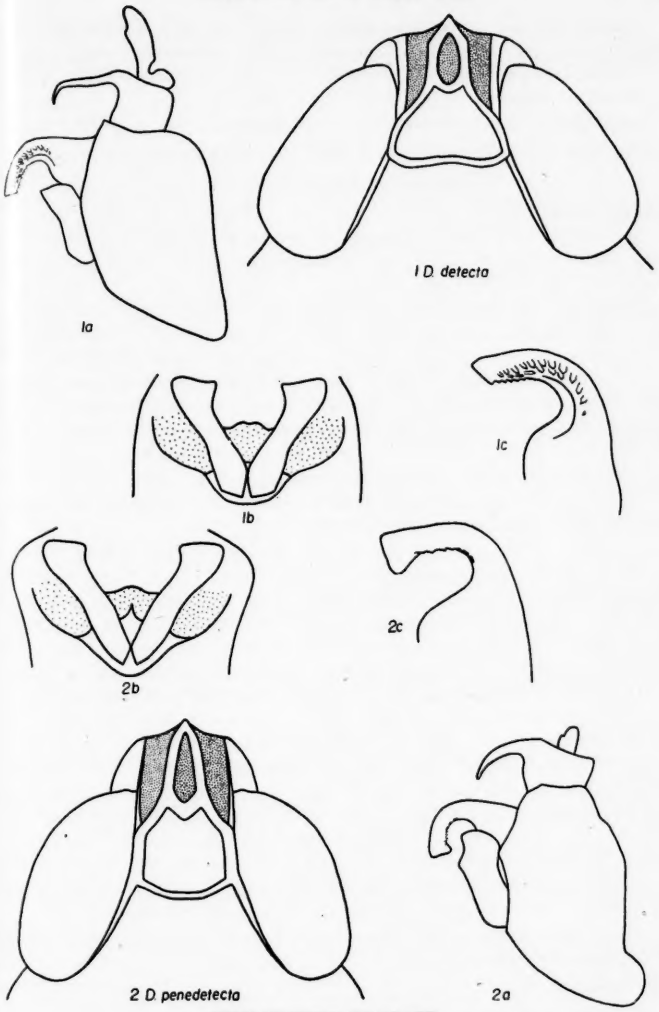
**Brachypterous form:**

Resembling the macropterous form but elytra short, barely longer than wide.

**Structure:** First segment of antennae about as long as wide; front about twice as long as wide, widest near middle, narrowed toward each end, distinctly tricarinate; crown about as wide as long, extending in front of eye about one-fourth its length, carinae distinct; elytra slightly longer than wide, apices broadly rounded, veins raised.

**Color:** General color stramineous; area between carinae of front and median fovea of crown black; dorsum of lateral fourth of first four abdominal segments dark except on posterior and lateral margin; male genital capsule dark brown except about median third of dorsum.

**Genitalia:** In lateral view, pygofer of male more or less rectangular; anal segment with a pair of long slender processes curving out at apices; aedeagus widest at base, strongly converging on ventral margin near basal third to about one-third basal width, curving in a semicircle to blunt apex, lateral margins of outer half with numerous short teeth; aedeagal brace not visible; styles broad, sides more or less parallel, outer margin concave. In caudal view, aedeagal brace slightly raised dorsally with slight median notch; styles widest and more or less avicephaliform at apices.




**EXPLANATION OF PLATE**

1. **Delphacodes detecta** (Van D.), dorsal view of head; 1a, lateral view of genital capsule, showing anal segment with processes, aedeagus and styles; 1b, caudo-ventral view of genital capsule, showing aedeagal brace and styles; 1c, enlarged view of aedeagus in lateral view.
2. **Delphacodes penedecta** n. sp., dorsal view of head; 2a, lateral view of genital capsule, showing anal segment with processes, aedeagus and styles; 2b, caudo-ventral view of genital capsule, showing aedeagal brace and styles; 2c, enlarged view of aedeagus in lateral view.

Holomorphotype ♂, allomorphotype ♀, 5♂ and 6♀ paramorphotypes, Mystic, Conn., Aug. 8, 1946, R. H. Beamer; other paramorphotypes: 2♂♂ and 1♀, same place and date, J. D. Beamer; 2♂♂ and 1♀, Cape Henry, Va., July 3, 1938, P. W. Oman.

Morphotypes and paramorphotypes in the Snow Entomological Collections, paramorphotypes in the U. S. National Museum.

**Delphacodes penedetecta** n. sp.

**Brachypterous form:**

Resembling **Delphacodes detecta** but crown about one-third longer than basal width instead of as wide as long and distinctly narrowed toward apex. Length ♂ 2.5 mm., ♀ 3 mm.

**Structure:** First segment of antennae about twice as long as wide; front about five times as long as greatest width, widest on apical third, distinctly narrowed on basal third, very slightly so at extreme apex, strongly tricarinate; crown one-third longer than basal width, narrowed from base to apex, extending in front of eyes about one third its length, strongly carinate; elytra more or less rectangular, longer than wide, apices broadly rounded, veins raised.

**Color:** General color stramineous; frontal carinae bordered with dark; most of dorsum of first three abdominal segments and nearly all of genital capsule brown to black.

**Genitalia:** In lateral view, pygofer of male more or less rectangular with anterior-ventral corner extended anteriorly; anal segment with a pair of curved processes about as long as width of segment, not curving laterally as in **detecta;** aedeagus wide on basal third, narrowed on ventral margin near basal third to one-fourth basal width, curved ventrally in semicircle, apex widened and ventral margin with roughened corrugations, lateral margins without teeth; aedeagal brace not visible; styles broad, sides almost parallel, concave near outer third on inner margin, convex in same region on outer margin. In caudal view, aedeagal brace slightly produced but not excavated at apex; styles widest at apices, spatulate with inner corner somewhat acute.

Holotype ♂, allotype ♀, and 3♂ paratypes, Cedar Keys, Fla., March 8, 1947, L. D. Beamer; other paratypes: 4♂♂, same place and date, R. H. Beamer; 1♂ same place, August 10, 1939, J. D. Beamer; 1♂, Slidell, La., March 3, 1947, R. H. Beamer; 7♂♂ and 4 ♀♀, Sarasota, Fla., March 16, 1928; 3♂♂, Jacksonville, Fla., March 29, 1928, E. D. Ball; 3♂♂, Daytona, Fla., Feb. 28, 1926, E. D. Ball; 1♂ and 1♀, same place and collector, Dec. 5, 1926.

Types and paratypes in Snow Entomological Collections, paratypes in U. S. National Museum.

**Macropterous form:**

Like the brachypterous form but with flight wings; elytra extending about one-third their length beyond the abdomen, widest in region of cross-veins, rather milky in color; pronotum lighter.

Holomorphotype ♂ and 1♂ paramorphotype, Buras, La., June 21, 1948, R. H. Beamer; allomorphotype ♀, same place and date, E. L. Todd.

Morphotypes in the Snow Entomological Collections.

# SOME NEW AND POORLY-KNOWN ADOXOMYIINAE[1] (DIPTERA, STRATIOMYIDAE) FROM THE SOUTHWEST

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The present paper presents descriptions of two new forms of **Adoxomyia,** from the Snow Entomological Collection of the University of Kansas, and notes which the author has accumulated on other Adoxomyiinae from the southwestern United States.

## Genus ADOXOMYIA Kertész

1907, Ann. Mus. Nat. Hungarici, 5:499.

The Nearctic species of **Adoxomyia** have been treated by the author in two previous papers (James, 1935, 1943). The discovery of two new forms in our fauna necessitates this addition.

### **Adoxomyia appressa cibolae,** new subspecies

Similar to the typical form, except that the antenna of the male is entirely black and the knees and extreme apices of all tibiae are reddish. These differences seem trivial, but they appear to be constant. The male runs in my key (James, 1943, p. 166) to **rustica** O. S. but may readily be distinguished by its appressed mesonotal pile and the predominantly white pile of the face; the female runs to a typical **appressa** and is less easily distingushed, the more distinctly pale knees and tibial apices being, perhaps, the most diagnostic character. The subspecific name refers to the Cibola National Forest, near the edge of which the type locality is situated.

**Holotype,** male Tijique, New Mexico, June 25, 1941, (R. H. Beamer); Snow Entomological Collection of the University of Kansas. **Allotype,** female, same data. **Paratype;** 26 males, 3 females, same data; 7 males, Tijique, New Mexico, June 25, 1941 (E. L. Todd); 1 male, Jemez Springs, New Mexico, July 1, 1941 (R. H. Beamer).

The form **cibolae** seems to be a northeastern subspecies of **appressa.** My records indicate that typical **appressa** runs from southern New Mexico (Cloudcraft, type locality) through Arizona (Grand Canyon, Oak Creek Canyon) to southern California (Coalinga, El Portal), whereas **cibolae** occurs in central and northern New Mexico.

### **Adoxomyia micheneri,** new species

**Male.** — Black. Eyes with rather dense, black pile, that is longer than first antennal segment. Pile of face and cheeks dense, mostly silvery, a few black hairs on the face; occipital orbits silver-tomentose. Ratio of scape, pedicel, flagellum, and style 4:5:15:7. The first three segments of flagellum reddish, antenna otherwise black.

Mesonotum and scutellum mostly pale-yellow-tomentose; three black-tomentose stripes extending almost the length of the mesonotum, but not quite reaching the anterior margin or the scutellum. Mesonotum with abundant, long, erect pile, blackish on the sides, otherwise white. Scutellum with long, mostly black pile dorsally and on the spines, and with two prom-

1 Equals Clitellariinae of Authors.

inent areas of silvery pile below. Scutellar spines strong, 0.55 length of scutellum, black except for the reddish extreme apices. Pleura with silvery tomentum and pile, the hypopleura glabrous. Legs black, the hind basitarsus tending to be reddish; pile whitish. Wings slightly and uniformly infuscated, the veins black, the stigma prominent. Halteres yellow.

Abdomen with middle of first tergum glabrous; second and third, except for broad sides, and base of fourth, black-tomentose, otherwise with very pale yellowish tomentum; whitish pile laterally and ventrally.

Length, 7.5 mm.

**Female.** — Pile of eyes shorter than in male, mostly black on upper third, otherwise whitish. All pile and tomentum of head silvery to whitish, the pile shorter than in the male. Reddish area of antenna more conspicuous, the apex of the pedical being red. Mesonotum without erect pile, but tomentum not flatly appressed; pile of scutellum and of spines whitish. Black-tomentose areas of abdomen reduced to two large triangular areas, broadly connected medially, on the third tergum, and an almost interrupted basal cross band on the fourth. Otherwise, except sexually, as in the male. Length, 7.5-8 mm.

**Holotype,** male, Corrizo Springs, Texas, April 14, 1949 (Michener and Beamer), Snow Entomological Collection of the University of Kansas. **Allotype,** female, same data. **Paratype,** female, same data.

This species does not run satisfactorily in my key (James 1943, p. 166). The female traces to **appressa** James, but the scutellar spines are stronger and the antennal flagellum more slender (ratio of maximum width of flagellum to length of scape 1:1, as compared to 1.5:1 in **appressa**). The male would trace to **lata** (Loew) on the basis of the erect pile of the mesonotum, but is at variance with that species in respect to the color of the thoracic and abdominal pile and tomentum. The strong, mainly black scutellar spines will readily distinguish **micheneri** from **claripennis** James and **argentata** (Williston).

## Genus DIEURYNEURA James

1937, Bull. Brooklyn Ent. Soc., 32:152.

**Dieuryneura obscura** (Coquillett), new comb.

**Aochletus obscurus** Coquillett, 1902, Proc. U. S. Nat. Mus. 25:98

**Dieuryneura callosa** James, 1937, Bull. Brooklyn Ent. Soc. 32:153 (new synonymy).

The above synonymy was determined by a study of Coquillett's type in the United States National Museum. My error in describing **callosa** as new was the result of Coquillett's reference of his species to a genus belonging to an entirely different section of the subfamily.

I have the following records for the species. TEXAS: Davis Mts., May 27, 1935, and June 2, 1937 (J. N. Knull). NEW MEXICO; Lordsburg, July 16, 1948 (W. Nutting). ARIZONA: Sulphur Spring Valley (Type series of **obscura**); Baboquivari Mts., Tucson, Tonto National Monument, Santa Rita Mts., and Globe (Type series of **callosa**); Hualpai Mts., July 4, 1937 (D. J. and J. N. Knull); Ruby, July 22, 1938 (R. H. Beamer). CALIFORNIA: Los Angeles County (Type series of **obscura**); Palmdale (type series of **callosa**);

Pinon flat, San. Jacinto Mts., June 4 and May 27, 1939 (M. A. Cazier); Sunset Valley, Santa Barbara County, June, 1939, (B. White); Los Angeles County, July 27, 1935 (Roger C. Smith).

**Genus CAMPTOPELTA Williston**

1917, Ann. Ent. Soc. Amer., 10:23.

This genus, based on the generotype and so far the only known species, **C. aldrichi** Williston, was described from a female from Socorro, New Mexico, and was considered by its author to belong to the Stratiomyinae. An examination of the type reveals that in spite of the presence of cross-vein m-cu, the usual diagnostic character for separating the two subfamilies, the relationship of this genus is with **Nemotelus** in the Adoxomyiinae. The antennal structure is essentially the same; the face is produced into a slight cone, similar to the facial protuberance of **N. melanderi** Banks; and the wing venation, except for the presence of m-cu, is closely similar.

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## TWO NEW GENERIC NAMES

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Some years ago I prepared a list of words that I might wish to propose as new generic names. I depended upon an assistant to check these names in Neave and the Zoological Record and they were all reported as available. I find, however, to my surprise and chagrin that two of those which I published appear in Neave's **Nomenclator Zoölogicus**, and therefore my genera must have new names.

**Paranychia,** which I proposed for a genus of Notonectidae in the **Journal of the Kansas Entomological Society,** vol. XIX, p. 59 (1946), is preoccupied by **Paranychia** Czerniavsky 1882 for a genus of Polychaeta. I therefore substitute for **Paranychia** Hungerford 1946 the name **Neonychia** with **P. congoensis** Hungerford as the genotype.

**Trichometra,** proposed by me for a genus of Hydrometridae in Bulletin 142 of the Bernice P. Bishop Museum, p. 217 (1939), is preoccupied by **Trichometra** Clark 1908 for a genus of Echinoderms. I therefore substitute for **Trichometra** Hungerford 1939 the name **Chaetometra** with **T. robusta** Hungerford as the genotype.

# SOME UTAH MITES - 1949

G. F. KNOWLTON AND S. C. MA
Utah Agricultural Experiment Station, Logan

During the past ten years the mite problem in Utah gradually has become more serious. Before that time, pear leaf blister mite, brown mite, European red mite, and two-spotted mite injury to fruit trees, as well as occasional mite injury to alfalfa, beans, and other plants was noted. During recent years, bud mite and rust mite injury of serious nature to pears, apples and to certain other fruits was recognized by C. D. Ashton. About this time, H. E. Dorst, W. E. Peay, and the senior writer were finding occasional spots of tomato russet mite injury in tomato fields near Payson, Hooper, Magna, Layton and Kaysville. The blue oat mite recently became a serious pest in some Salt Lake County fields of fall irrigated wheat and this pest also was found in parts of Tooele County.

Mite injury during late summer of 1949 was unusually extensive and often severe, especially in Utah orchards wherever mite populations were allowed to build up. Two-spotted mite injury to alfalfa, beans, and to a variety of other crops also was recognized. Through the much appreciated help of Dr. F. M. Summers and Dr. E. B. Baker the following specific records of mite injury and occurrence were obtained during 1949:

**Amblyseius americanus** Garman. On fallen leaves beneath serious mit-injured pear trees at Hunter, September 8, and on apple and cherry leaves at Logan.

**Anystis agilis** Banks. This predacious mite was present on seriously infested milkweed plants at Orem in August; on yarrow and pear at Magna. It was also collected at Whitney, Idaho.

**Bryobia praetiosa** Koch. Injuring alfalfa and sweetclover at Orem, plum leaves at Farmington, apple foliage at Provo and Garland, arborvitae at Brigham, cherry at Provo, horse-chestnut, Colorado blue spruce and alfalfa at Logan. This species was extremely numerous on **Chrysothamnus nauseosus** at Indian Creek ranches in San Juan County, in May.

**Caloglyphus longitarsus.** On mite-damaged garden plants at Boneta during September.

**Cunaxa taurus** (Kram.). On mite-injured pear leaves at Provo and apple leaves at Beaver Dam, during September and October.

**Cyta latirostris** Herm. Probably preying on the springtails which were numerous among apple leaves at Provo, October 27.

**Ereynestes** (near **berlesei** Ouds.). On celery trimmings at American Fork and Honeyville, among pea vine waste at Farmington, and on flowering peach, poplar, pear leaves, and recently cut off carrot tops at Provo, during the fall.

**Eriophyes boycei** Keifer. On mite-damaged ragweed leaves at Magna, September.

**E. pyri** (Pag.). Infesting apple and pear leaves at Indian Creek ranches in San Juan County during May. Commonly injurious to neglected orchards throughout Utah.

**Eutrombidium trigonum** (Herm.). Attacking grasshopper nymphs in Logan Canyon, Orem and Amalga during July.

**Lorryia ferulus** Baker. On fallen lilac leaves at Paris, Idaho, during April.

**Paratetranychus Pilosus** (C.-F.). Damaging plum leaves at Logan, on pear and poplar leaves at Provo, and apple leaves at Orem.

**P. simplex** (Banks). Damaging corn at Magna. Also numerous on grass at Franklin, Idaho, during November.

**P. ununguis** (J.). Infesting juniper at Crystal Springs and arborvitae at Farmington. This species seriously injured all Colorado blue spruce trees at the cemetery and also many around homes at Smithfield during 1933. A few on Potawatami plum leaves at Farmington during September.

**P. viridis** (?) Banks. On cherry foliage at Farmington, November 12.

**Pentamerismus erythraeus** (Ewing). On Utah juniper and red cedar in Logan Canyon, November 19; apparently damaging cherry leaves at Farmington; from poplar bark placed in Berlese funnel collected at Garden City, November; arborvitae at Brigham cemetery; among celery trimmings and on growing celery in field at Corinne, November 17, on mite-damaged apple leaves at Beaver Dam. Also collected on Colorado blue spruce at Paris, Idaho and on juniper at Bloomington, Idaho, November 15.

**P.** nr. **oregonensis** McG. On lilac and potawatami plum leaves at Logan, September.

**Pergamasus crassipes** var. **longicornis**. On hybrid Mountain Ash at Logan, November.

**Petrobia latens** (Müll.). Damaging wheat and rye south of Bacchus, and at Erda and Garfield during June.

**Penthaleus major** (Duges). Damaging dry farm wheat southwest of Hunter in two large fields in April; Erda on alfalfa.

**Pronematus ubiquitus** McG. On apricot at Farmington in November; on celery at Midvale in October; infesting American elm at Logan.

**Phyllocoptes immigrans** K. on **Tamarix** at Corinne, October.

**Rhizoglyphus hyacinthi** Bdv. On onions at Midvale and Logan.

**Tarsonemus** sp. Among cast-away celery hearts at Midvale; pea vine waste at Farmington.

**Tetranychus atlanticus** McG. Seriously damaging strawberry foliage at Roy during August; on alfalfa at Logan, Nibley, and Petersboro in August; damaging ragweed leaves at Magna, and numerous on celery trimmings at Midvale in November.

**T. bimaculatus** Harvey. "Two spotted" mites identified as **T. bimaculatus** were serious pests of alfalfa throughout Utah and especially damaging to alfalfa left for seed in the Delta-Sutherland area; damaging apple, peach, pear, plum, sweet clover in the Linden, Orem, Magna, and Hunter areas; infesting celery and celery trimmings at Honeyville; plum and rose at Kaysville and Farmington; damaging raspberry, apple, and seed alfalfa foliage at Logan; damaging **Aspidestrus** and tree fruits at Ogden; on **Melilotus alba** and **Bassia** at Delta; and damaging garden beans in many communities throughout Utah. The most general and important pest species in Utah during 1949.

**T. pacificus** McG. On plum leaves at Logan in October and on rose at Hunter during June.

**T. telarius** (L.). "Two spotted" mites identified as **T. telarius** were damaging apple foliage at Garland, arborvitae at Brigham, hybrid mountain ash, white birch, boxelder, horse chestnut, poplar, and ash foliage at Logan, apricot, peach, and pear leaves in a heavily mite infested orchard at Hunter, English walnut at Farmington, peach at Orem, and alfalfa at Sutherland during July.

**T. willamettei** McG. Injuring apple foliage at Hunter in November, on Hybrid mountain ash and white birch leaves on the College campus at Logan during September.

**T. libocedri** McG. Some damage to cedar and red cedar at Logan; on red cedar in Logan Canyon; on ornamental arborvitae at the experimental farm at Farmington.

**T. mcdanieli** McG. On apple leaves at Riverton, November 12.

**Trichadenus floridanus** (Banks). On salt grass at Bennett during August.

**Tyrophagus linterni** Osborn. On apple leaves at Garland; pear leaves at Provo during September.

**Tydeus zempoalensis** Baker. On mite-injured apple leaves at Beaver Dam, on celery at Logan, and on **Salix** leaves at Benson.

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# KANSAS BEES OF THE GENUS AGAPOSTEMON GUERIN (HYMENOPTERA, HALICTIDAE)

ROLAND L. FISCHER[1]

## INTRODUCTION

In working over the material of the genus **Agapostemon** in the collection of the Kansas State College, it was at once apparent that many new records on the distribution within the state, as well as in adjacent areas, existed. The material studied consisted of over 350 specimens representing 30 Kansas counties. In addition to the material represented in the Kansas State College, the author is indebted to Dr. H. B. Hungerford for the loan of material in the Snow Entomological Collection of Kansas University, and to Dr. C. D. Michener for nomenclatorial suggestions in connection with the study. The results of this investigation, based upon the above collections, are herein recorded.

Due to the recent revision of the genus by Sandhouse (1936) and her excellent keys to the species occurring within the United States, it is deemed unnecessary to include keys to Kansas species. Rather, an annotated list of Kansas species including flower preferences and range of seasonal activity, as far as known, is included. Flight ranges and flower preferences are necessarily those of Kansas; however, in other midwestern areas in which the flora and ecological conditions are similar to Kansas, the flower preferences and the seasonal activity ranges probably are closely correlated.

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[1] Contribution No. 567 from the Department of Entomology, Kansas State College.

## TAXONOMIC POSITION

**Agapostemon** Guerin is a genus of medium sized (8 to 15mm.long)halictine bees. The genus may be separated from other genera of North American Halictinae by the long posterior tibia which is as long as, or longer than, the entire tarsus. A marked sexual dimorphism also occurs. The thorax of both the male and the female is always a brilliant metallic green or bluish-green, having varying amounts and types of rugosity and punctation. The abdomen of the female is either metallic colored similar to the thorax, or entirely black. Compared with the female, the male's abdomen is yellow with contrasting transverse bands of brown, black, or metallic blue.

## KANSAS SPECIES OF AGAPOSTEMON

1 **Agapostemon virescens** (Fabricius)

The species is distributed throughout the United States, and represented in Kansas from Riley, Meade, Wallace, Coffey, McPherson and Republic counties. It is active from mid-June through October. The only known plant from which specimens have been taken in Kansas is the Bush Morning Glory, **Ipomoea leptophylla.** This species probably is generally distributed throughout the state, but is not very abundant since only 25 individuals are represented in collections.

2. **Agapostemon coloradensis** Crawford.

Sandhouse (1936)[1] states that this species is "apparently limited to the southern Rocky Mountain region from South Dakota and Colorado to western Texas, southern Arizona and Mexico." Thirty-six specimens in the Kansas material studied clearly belong to **A. coloradensis.** This extends the range of the species well eastward of the previously known range, probably representing the most eastward extension of the species, since representatives have been collected only in the central and western portion of the state.

Areas represented in Kansas include primarily the central and western counties of Seward, Cloud, Stafford, Wallace, Cheyenne, Sheridan, Ellsworth, Lane, Finney, Hamilton, Clark, Morton and Ford. Collecting dates indicated that flight activity ranges from the latter portion of June to mid-October. Plant preferences are unknown.

3. **Agapostemon fasciatus** Crawford.

In her revision of the genus, Sandhouse records this species from Clay County, Kansas, as well as two other isolated state records of Colorado and Nebraska. In the present study seven females add two additional Kansas distributional records to the known range of the species. Six of these specimens were collected in May and June in Clark County, and the remaining specimen was collected in Hamilton County. The small number of individuals, as well as the few records indicate that this species is not of common occurrence and is probably limited in its range within Kansas to the western portion of the state. Plant preferences are unknown.

4. **Agapostemon splendens** (Lepeletier).

This species is represented within the state from collections at the sand dunes of Medora, Kansas, in Reno County, and in Riley County. The few specimens available indicate the range of flight activity occurs between the

end of June and mid-October. Plant preferences are unknown. The two county records and the six representatives suggest that this species is uncommon in Kansas.

5. **Agapostemon radiatus** (Say).

This eastern species is probably found largely in the eastern portion of the state, with only occasional specimens being found in the more western areas it is represented by specimens from Douglas, Riley, McPherson, Osage, Morris and Trego counties. Cragin (1886) records the species from Barber County, and Bridwell (1899) also records it from Douglas County. Period of flight extends from mid-April to mid-October. Plants from which it has been collected include apricot, alfalfa, **Aster** sp., and **Polygonum** sp. It is a fairly abundant species, which perhaps rivals **A. texanus** in numbers in the eastern portion of the state.

6. **Agapostemon texanus** Cresson.

Counties represented from Kansas include Hamilton, McPherson, Saline, Russell, Wallace, Stafford, Cloud, Riley, Greeley, Logan, Sheridan, Morton, Seward, and Shawnee. Tucker (1909) and Bridwell (1899) record Douglas County, and Snow (1881) includes Wallace as well as Douglas. The very large series of over a hundred individuals, as well as the many county records are indicative of the abundance of this species. It is the most common member of the genus found within the state, and probably has a general distribution throughout the area.

**A. texanus** displays a great amount of variability. This is particularly true in the extent and nature of the rugosity of the propodeum, the punctation of the thorax, and the amount of pilosity of both the thorax and abdomen of the females. The males, while displaying some variability in the propodeal rugosity and the metallic coloring of the abdomen, are very markedly constant in regard to structure of the genitalia. This apparent variability probably accounts in large measure for the synonomy which has occurred with this species.

The period of activity extends from the latter portion of April through October, and frequently individuals still may be found in early November. Plants visited include alfalfa: soybean; Snow-on-the-mountain, **Euphorbia marginata; Helianthus sp.; Grindelia sp;** and **Aster sp.**

7. **Agapostemon angelicus** Cockerell

This is a western species whose distribution in Kansas is similar to **A. coloradensis,** being represented from Ellis, Wallace, Clark, Morton, Finney, Riley, and Stafford counties. The period of activity extends from May to mid-October. Plants which it is known to frequent are alfalfa and apple. Apparently, this is not a common species within the state, since only a few specimens are represented.

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